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Devoted to Textile Chemistry
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DYESTUFF REPORTER

VOLUME 43 JANUARY 18, 1954 NUMBER 2

HISTORICAL NOTES ON THE WET-PROCESSING INDUSTRY

I——How Napoleon Aided the Early Dyeing Industry of France

SIDNEY M EDELSTEIN
Dexter Chemical Corporation

This is the first in a series of historical articles which the textile chemist and colorist will find of interest.

The author, a prominent science historian, is the founder of an outstanding collection of great works, documents and letters in the history of chemistry and related sciences.

Articles and illustrations in this series are from the author's library.

NAPOLEON, the military genius, firmly believed that his ability to wage war was inseparable from the sound economic condition of France. For this reason he surrounded himself with scientists, engineers, and manufacturers, elevating many of them to high positions in his government.

One of these, Jean Antoine-Claude Chaptal, Napoleon raised to Count of Chanteloup. Chaptal was a physician-chemist, manufacturer and one of the outstanding writers in the field of chemistry. His books were translated into many languages and special editions were published even in the early days of the American Republic by its young chemists. Chaptal was a student of the chemistry of dyeing and did everything in his power to expand the dyeing industry of France under Napoleon. His successful work for France led to his promotion to councilor of state in 1799 and in 1801 he was made Minister of the Interior.

Figure 1 shows, in Chaptal's own hand, the draft prepared as a decree of Napoleon, relating to a prize to be given for an improved madder red on wool. The free English translation of this manuscript follows:

Program Relating to a Prize on Madder

One of the fastest colors obtained from extracts of indigenous plants is that supplied by the root of madder.

This plant, which is grown in the south and in the north of France, yields a fast red for wool and cotton. This color is known commercially as madder red for wool and turkey red for cotton.

The color which cotton takes is more brilliant and faster because of the finish given to the material. For a long time it has been thought possible to give to wool the same striking vividness of color, but up to now all efforts have been useless. Nevertheless, the results obtained by M Roard, director general of the Imperial Tapestry Dye Works, have made it impossible to doubt any longer that this aim may be attained, and for this reason His Imperial and Royal Majesty has been led to propose the prize which follows:

Napoleon &c &c

Decrees that which follows—

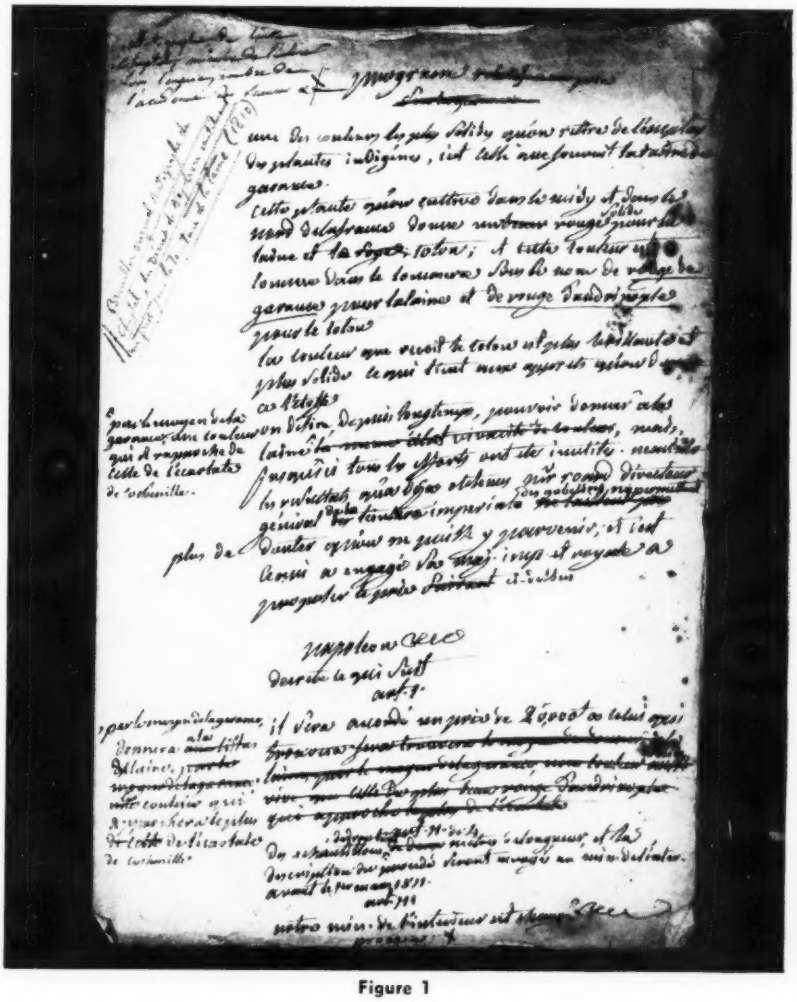

Figure 1

1

A prize of 20,000 livres will be granted to the person who will find how to give to wool by means of madder a solid vivid color as the most beautiful turkey red and which most closely resembles cochineal scarlet.

2

Samples of dyed woolen material four meters long and description of the process will be sent to the Secretary of the Interior before March 1, 1811.

3

Our Secretary of the Interior is to take charge of the program.

The political and commercial implications behind this document are most interesting. During the time this document was written (1810), Napoleon had reached the peak of his power in Europe and the first indications of a decline were visible. The British were beginning to attack French shipping. Cochineal, which produced the most brilliant reds on wool, came from Mexico. Although Napoleon controlled Spain for the most part, the first revolution against the Spanish government in Mexico was under way. Hence, the commercial cochineal industry of Mexico was in a turmoil. In cases where shipments of cochineal did leave for France, the odds were heavy that the ship might be captured by the British. Obviously, it was more desirable for France to use a native product than to attempt to import cochineal for brilliant reds on wool.

Figure 2
Front and back views of a medal struck in honor of Jean Antoine-Claude Chaptel.

Madder was an important source of reddish dyes in France from the earliest times. In the seventh century there is a record of the cultivation of madder at St Denis near Paris. Charlemagne decreed that madder should be grown throughout his empire. The Dutch for many centuries captured the madder business from France, but during the reign of Louis XV madder growing in France was reawakened and became extremely important. The industry practically disappeared during the unrest of the French Revolution, which probably accounts for another reason for the above decree. Undoubtedly Napoleon and Chaptal had in mind helping to increase the use of madder so as to also help the farmers of France.

It isn't known who won the prize or whether any was actually given. It is known that it was some 14 years later (in 1824) before the main coloring matter of madder, alizarin, was isolated. Unquestionably, the poor colors obtained with the normal madder on wool were due to the fact that, in addition to the alizarin, there were other dyestuffs present in madder which gave browns and yellows, thus dulling the color. Towards the end of the 19th century the synthesis of alizarin completely eliminated the interest in cochineal and other natural coloring matters for wool.

ABSTRACTS

Silicone Resins Add More Pluses to Your Acetate

P Duggan and F Fortess, *Modern Textiles* 34, 31, 60-66, March, 1953.

Although silicones have attained industrial importance only within the past decade, they have been of particular interest to the textile industry primarily because of their exceptional water repellency. Recent extensive investigations in the Celanese Research Laboratories have disclosed many additional desirable properties, including:

Softness and fullness of hand;
Improved abrasion resistance and tear strength;
Improved wrinkle recovery;
Greater resistance to inorganic and aqueous soils and stains, such as inks and fruit juices; and
Improved sewability by the reduction of needle-hole fusion and cut yarns.

Thus far, no undesirable properties have been observed with the application of the silicones to acetate and acetate-rayon blends, with the possible exception of an increased tendency to static formation.

The typical silicone fluid, such as Dow Corning's DeCetex 104, or silicone emulsion, such as Arkansas' Hydro-Pruf, consists of relatively long, more or less linear chains of silicon and oxygen atoms to which are attached hydrophobic groups, such as methyl, which make the molecule water-repellent.

These materials, as marketed, are readily soluble in any dry-cleaning fluid and could be easily removed from the fabric by washing or dry cleaning. However, after application to the fabric, this high molecular weight resin may be made completely insoluble by curing at 300-320° F for 4 to 8 minutes. This reaction is primarily one of atmospheric oxidation of the hydrogen atoms, which results in cross-linking.

The application of the silicones to 100 per cent acetate, or in conjunction with other resins for acetate blends, requires only standard equipment already available in the average finishing mill resin-treating acetate-rayon blends.

The authors stress the importance of removing all foreign matter from the fabric surface before applying the silicone. They describe in detail the preparation of the finish emulsion and its application, followed by drying and curing. They state that silicone treatments have been applied satisfactorily in a number of mills, but they caution that each finisher must learn to adapt the silicone to his own equipment.—WHC.

Applications of Plastic in Textiles

A Hill, *Textile Mfr* 79, 101-2, February, 1953.

The author briefly reviews the history of plastic applications, commencing with the production of artificial leather-cloth from cellulose nitrate-coated fabrics. The principal subject of his paper, however, is the application of polyvinyl chloride (P V C).

P V C resin in its original form is a comparatively rigid material, but when compounded with certain plasticizers it acquires rubber-like characteristics. It is ordinarily applied to textiles in this form.

The plasticizers are usually esters of phosphoric, phthalic, or sebacic acid. The

phosphates improve the fire-resistance of the compounds. The mechanical properties vary, the sebacate plasticizers giving more rubber-like compounds, while the phosphates produce more leather-like substances, the phthalates being intermediate.

Two main techniques are employed in applying the resins to the textile:

(a) The plasticized compound, prepared hot, is calendered into a film form which in turn is calendered onto the surface of the fabric.

(b) The resin is mixed with the plasticizer at room temperature and spread over the surface of the cloth. On passing through a heated zone (using infrared radiation at about 170°C) the paste is converted to a homogeneous plastic film with good adhesion. It can be embossed while in the hot state.

The end uses of this type of coated material include leather cloth for upholstery, traveling bags, handbags, footwear, and bookbinding. It also finds application in table coverings, rainwear (replacing oilskins for fishermen), and flameproof tarpaulins. Other uses include floor coverings and conveyor belts.—WHC.

The Quantitative Separation of Fiber Mixtures by Flotation

S H Mhatre and G P Tawde, *J Textile Inst* 44, T70-75, February, 1953.

The increasing use of mixed fibers for various textiles has made it necessary to have methods for analyzing a variety of fiber mixtures. Methods used for such analysis are solubility, counting, froth-flotation and density.

The solubility method is applicable only in those cases where there is a considerable difference in the solution characteristics of the two components, such as acetate and viscose, wool and cotton, etc. The method, however, is not applicable when there is a negligible difference in the solution characteristics, such as for example, wool and Lanital, and cotton and jute. In certain cases methods based on the differences in the rate of solution have been suggested. Da Schio has described a method for the estimation of wool mixed with Lanital which depends on the solubilities of the fibers in caustic soda. Viscose-cotton mixtures can be estimated by the well-known calcium thiocyanate method. Good results, however, can be obtained only if the conditions of time, temperature, and the concentration of the reagent are strictly adhered to, and in any case a correction is necessary for the solubility of the other constituent.

The method of counting under the microscope, although very simple, is extremely tedious unless there is a distinct visible difference between the two constituents. The froth-flotation method requires very rigid conditions for reproducibility.

Differences in the densities of the fibers afford a ready means of estimation. The method devised by Preston and Nimkar, based on this principle, using a density gradient tube, is briefly referred to, as is Larose's method of separating wool from Lanital by floating in a liquid of intermediate density.

The authors describe experiments which they have carried out on a number of fiber mixtures, using combinations of carbon tetrachloride and xylene. Such mixtures cover the range of density of almost all the known fibers. The fiber mixture to be tested is stirred in the proper amounts of the two liquids and allowed to stand for from 2 to 16 hours, depending on the difference in the densities of the constituent fibers. When there is a distinct separation the two layers of fibers are removed separately, dried and weighed.

The authors have used this method successfully for determining mixtures of cotton and wool, viscose and acetate, cotton and jute, cotton and viscose, and wool and silk. They state that the method can be applied to almost all types of fiber mixtures.

A table of densities of 30 different fibers is appended.—WHC.

Soiling and Soil Retention in Textile Fibers: Suspending Power of Surfactants

J Compton and W J Hart, *Ind Eng Chem* 45, 597-601, March, 1953.

The term "surfactant" as used in this paper includes any substance which when introduced into a heterogeneous system will act upon the interfaces of the system in such a manner as to produce changes of a property, or properties, of the system. The systems studied were limited to grease-free carbon black as the soil and cotton fibers as the substrate.

A theoretical analysis of the mechanisms of soil redeposition during laundering was made, and a technique for the evaluation of the effect of surfactants in such a system is presented.

High polymer surfactants are found to have the highest suspending power as a group, both individually and in combination with detergents. This was also found to be the case when the amount of additive was small relative to the detergent. Of the surfactants tested, the anionic cellulose derivatives and polyvinyl alcohol are outstanding in this respect.

Either synergism or antagonism usually results from combinations of surfactants. The interactions of these combinations are in general nonlinear and nonadditive.

Addition of alkaline builders to detergents decreases the suspending power of the detergent, but this effect can be overcome by the addition of small amounts of high polymer suspensants which show synergism. The amount of suspensant required varies with the detergent and amount of builder present.

A negative temperature coefficient for soil deposition on cotton fiber was found for fatty acid soap alone and in the presence of the additives, sodium cellulose glycolate and sodium cellulose sulfate, whereas a zero or positive temperature coefficient was found for the synthetic detergents, sodium *N*-methyl-*N*-oleoyl taurate and an alkyl aryl sodium sulfonate under similar conditions. These phenomena may be of practical importance in detergency.

The complexity of interaction in surfactant systems makes it impossible at present to predict their behavior. More work in this field is recommended by the authors.—WHC.

The Modification of Cellulose by Chemical Means

A R Wachter, *Papers of A A T T* 8, 135-40, June, 1953.

The speaker prefaced his talk by stating that to date many yards of rayon fabrics have been sold as washable, and most of these were carefully and properly processed with fast dyestuffs, but as a means of stabilization urea or melamine resin was used. Fabrics so processed were washable only so far as color was concerned, but not at all fast as far as shrinkage was concerned. These resins, when properly applied, are an excellent means for imparting crease recovery properties to rayon fabrics which are used in garments not intended to be laundered.

Since we now have positive chemical methods to induce permanent shrinkage control, the speaker said, urea or melamine formaldehyde resins should not ever again be used on fabrics sold as washable. These resins are chlorine retentive and not at all durable to laundering. After a few launderings, the resin bond is broken and an excessive fabric shrinkage occurs. Today, we can not only dye but chemically finish rayon fabrics to be absolutely and positively shrink-resistant by three different processes, known as "Aquex," "Avcoset," and "X-2." All three methods are non-chlorine retentive, and any one of them prolongs rather than shortens the life of the cloth.

Aquex. Following is a typical formula:

10-15%	Aquex BNWC
10 %	Formaldehyde 37%
0.25%	Permas of F
2.25%	Sodium sulfate
2.25%	Sodium acid sulfate
1 %	Sequestrene

Fabrics are padded through this liquor, frame dried, cured at 310° F or over,

then washed and neutralized. This process is applicable to all types of rayon fabrics, especially shirtings, shorts, and pajamas.

Avcoset. This process is based on the application of a combination of a cellulose ether and formaldehyde. Following is a typical formula:

40 lbs	Avcoset WS (water soluble)
80 lbs	Formaldehyde 37%
4 lbs	Avcosol 104 Softener
16 lbs	Sodium bisulfate
4 lbs	Sodium sulfate
90 gals	

The fabric is padded, frame dried, cured at 315-330° F, washed and dried. Fabrics so treated, subjected to 50 launderings, are said to show little or no progressive shrinkage. The Avcoset process is not applicable to cotton because of a reduction in tensile strength.

X-2. This is a new textile finishing chemical developed by Dan River Mills. It is not a resin and is not related to the resins currently being used for impregnating rayons. It is applied to soured rayons by padding, drying, and curing, followed by thorough washing. Garments made of X-2-treated rayons are said to have a wear life at least double that of conventionally finished fabrics. The hand can be varied from very soft to very stiff.—WHC.

Customs Nomenclature

Anon, *Dyer* 109, 242, February 20, 1953.

Some pertinent comments on the question of nomenclature appear in the current *Bulletin* of the Silk and Rayon Users' Association. The Association comments that when Humpty Dumpty said, "When I use a word it means just what I choose it to mean—neither more nor less," he was more fortunate than H M Commissioners for Customs and Excise, who were obliged to seek confirmation in the Queen's Bench Division for their contention that when they used the description "artificial silk" they chose it to mean nylon. This interpretation of "artificial silk" was rejected by the Court, and the Lord Chief Justice said that there was no evidence on which, as a matter of law, it could be said that the nylon stockings in question were made of "artificial silk." The Association thinks it likely that a rapid amendment will be made to the Customs nomenclature, introducing a more satisfactory description than "artificial silk."—WHC.

Bleaching with Some Peroxygen Chemicals

B K Easton, *Canadian Textile J* 70, 62-4, 67, May 8, 1953.

Of the several peroxygen chemicals used in the textile industry, hydrogen peroxide is by far the most important as a bleaching agent. It is estimated that of all the cotton bleached in the U S today, over 80 per cent is peroxide bleached.

Hydrogen peroxide kier bleaching first became popular for bleaching colored yarn fabrics, since little or no change occurred to the colors. Then it was found that all-white cotton fabrics could be caustic kier-boiled, washed, and peroxide-bleached in one kier. From 0.5 to 1.5 per cent of hydrogen peroxide is employed, with 1 to 2 per cent of silicate of soda and a small amount of alkali. Bleaching times range from 4 to 8 hours, depending on the white desired, construction of the cloth, and type of cotton.

Around 1930 it was discovered that cotton fabrics could be bleached at room temperature by using a fairly concentrated alkaline peroxide solution and allowing the goods to stand at least 7 hours, usually overnight. This process, known as the "cold bleach," is used for knit goods because of the "soft downy hand" produced, and for bleaching small lots of special fabrics. By increasing the temperature, the time of treatment and concentration of peroxide can be reduced.

In the continuous peroxide bleach the goods are singed, desized, washed and squeezed, saturated with 3-4 per cent caustic soda, steamed for 1-1.5 hours in a J-box, washed and squeezed, saturated with 0.5-1.5 per cent hydrogen peroxide 35 per cent, 1-1.5 per cent silicate of soda, and 0.1 per cent caustic soda and steamed for one hour in a second J-box.

Viscose rayon bleaching does not present a serious problem. When present with cotton, it is general practice to follow the usual cotton procedures. If the viscose contains metallic residues, a sequestrant should be added.

Viscose rayon may also be bleached quickly and quite safely with peracetic acid. But a more popular usage at present for peracetic acid and one which has gained wide acceptance, according to the author, is the bleaching of acetate rayon. Here it is ideal because it is used at a neutral or slightly acid pH and the fear and worry of saponification is completely eliminated.

Of equal interest is the use of peracetic acid for bleaching nylon. The usual bleach bath will contain a small amount of polyphosphate, the peracetic acid, sufficient caustic soda to raise the pH near the neutral point, and sometimes a small amount of synthetic detergent. The temperature usually ranges from 170° to 200° F. All types of stainless steel equipment may be used.

Hydrogen peroxide is the foremost wool bleaching agent, whether the wool be in the form of raw stock, worsted top, yarn or piece goods. In the case of other animal fibers, such as alpaca, cashmere, rabbit fur, bleachers have found it an advantage to use persulfate along with peroxide.

The author describes the so-called "dry-in" process, in which peroxide is used in the first bowl of the scouring train. For the regular peroxide bleach on wool he prefers tetrasodium pyrophosphate to silicate because the resulting hand of the wool is softer. He states that the "cold bleach" is also popular in the wool industry, particularly for bleaching worsted top.—WHC.

Watch Out for Dynel!

C H Bayley and A S Tweedie, *Textile J Australia* 27, 1450, February, 1953 (from *Technical Bull*, Canadian Research Inst of Launderers and Cleaners).

Dynel is the most heat-sensitive fiber on the market at the present time which is likely to be found in clothing or household textiles. It shrinks and hardens at temperatures above 240° F. Thus, even temperatures which are safe for pressing acetate rayon can damage Dynel. It has many good properties which make it valuable for certain industrial uses, but because of its heat-sensitivity it is our opinion that its use for clothing and household fabrics introduces a serious serviceability hazard for the consumer public as well as for fabric-servicing industries, such as commercial laundries and dry-cleaning plants.

The authors have learned that large quantities of Dynel hose are being sold, presumably in the U S. If these turn up in Canadian laundries and are not marked for special handling, damage may result.

Two examples of Dynel socks damaged in laundering are described by the authors. One pair suffered severe hardening, shrinkage, and distortion when dried on ordinary steam-heated sock forms. The other pair had a brittle, fused area on each cuff where a thermoplastic laundry mark had been attached by a heating device.

The authors state that there is no problem in the actual washing operation, as the conditions which are suitable for washing wool socks will be equally suitable for Dynel. The main precaution is: Do not use steam-heated sock drying forms for drying Dynel socks. Either air-dry them or use the circulating hot-air type of form.

It is not possible to predict to what extent Dynel may be used in clothing and household textiles. Sime blankets and drapes of 100 per cent Dynel have been

made in the U S, and a number of lines of dress fabrics contain Dynel blended with other fibers. These blended fabrics may be less susceptible to damage, depending, of course, on the percentage of Dynel used.

The following is a summary of the information available to date regarding precautions to be observed in finishing Dynel fabrics:

1) Watch for labels stating that articles are made of Dynel.

2) Never finish Dynel articles on a hot-head press or with a steam iron, and do not use a steam iron to touch up rayon bindings or trim on Dynel blankets, etc.

3) If a hand iron is used, a dry cotton cover cloth should be used between the Dynel fabric and the iron, and the iron temperature control should be at the "Rayon" setting.

4) Steam pressing on covered puff-irons (max steam pressure 70 psi) or rapidly on a dry-cleaning press with grid head or covered head, is stated to be satisfactory.

5) Laundered drapes can be dried on frames, or air-dried and subsequently steam-pressed.—WHC.

Efficiency of Vat-Color Aging Depends on Temperature Control

T N Patrick, *Textile World* 103, 147, 236-42, June, 1953.

Where there is insufficient circulation in the aging chamber, the temperature variations can be very wide at different portions of the ager. At the center, overheating will probably be greatest because of poor circulation of steam, heat of solution, and chemical reaction.

Under faulty aging conditions, temperatures as high as 230° F have been recorded. Such high temperatures invariably mean poor color value. At 230° F the relative humidity is approximately 75 per cent, whereas at 216° F, a satisfactory temperature for aging, the relative humidity is about 94 per cent.

It is now agreed that some pressure is essential to good aging. The amount of pressure varies in individual cases. In some quarters it is maintained that a slight water-gauge pressure, say ½ to 1 inch, is sufficient to show that the aging chamber is free from air. Others maintain that several inches of water-gauge pressure is necessary to dissipate the excessive heat generated during the aging process.

Generated heat during aging may be caused by condensation of water vapor (said to be the main source of rise in temperature), heat of chemical reaction, and heat of solution of chemical reagents and leuco dyestuff. If the flow of steam is insufficient to dissipate this excess heat, evaporation at the printed-cloth surface will replace water absorption, with an adverse effect on dyestuff solution and on transfer from the print paste to the fiber.

The most favorable temperature range is from 212° to 218° F, corresponding roughly to the temperature between the bottom and the top of the aging chamber. However, experience indicates that from 216° to 220° F, or slightly more, will give satisfactory results in most cases.

Overheating in the ager can be reduced by running a well-conditioned grey cloth continuously, and by increasing the flow of steam. The presence of a cool, moist grey cloth has a good effect on color fixation and levelness.

The author reminds us that the three main phases through which the print cloth must pass to bring about fixation of the dyestuff on the fiber are:

1) Solution of the soluble ingredients of the print paste by absorption of water from the steam.

2) Reduction of the vat dyestuff in presence of the reducing agent and alkali in the print paste to a soluble leuco compound.

3) Adsorption of the reduced and solubilized dyestuff by the fiber as a result of transfer from the thickening agent.

The author recommends conditioning or cooling vat-color printed goods prior to aging, in order to dissipate the heat of drying of the prints and increase the moisture regain to normal.—WHC.

The Effects of the Soaping Aftertreatment on Vat Dyeings

H H Sumner, T Vickerstaff and E Waters, *J Soc Dyers Colourists* 69, 181-194, June, 1953.

The color changes produced in vat-dyed cellulose fibers by the normal soaping aftertreatment have been examined quantitatively by spectrophotometric methods, using dyed viscose film. From the increase in the orientation of the dye as shown by measurements of dichroism and from the analogous behavior observed during the aging of colloidal suspensions of vat dyes, it is concluded that the changes are associated with crystallization of the dye. The efficiency of various soaping agents has been measured and also the effect of the temperature of the treatment, and it has been shown that soap and Lissapol N at the boil are the most efficient methods of treatment of those examined.

The rate of crystallization can be extremely rapid even in water alone, but is improved by the addition of a detergent. The effect of temperature of soaping is more important than the time, and treatment at the boil is advisable when the time available is restricted.

It has also been found that the effects observed on viscose film occur also on normal commercial fabrics, although here the visual effect is diminished by the nature of the substrate and by the greater loss of dye which occurs in the soaping treatment owing to the greater relative surface area of fibrous materials. The light fastness of a series of vat dyes on cotton in the unsoaped and soaped states has been measured, and shows that soaping has, in general, little effect on light fastness. In those cases where changes are observed the effect may be either to increase or to decrease the light fastness according to the dye.

The absorption of light by dyes, and particularly vat dyes, is discussed at considerable length, with numerous tables and charts in illustration.—WHC.

Dynel

Anon, *Textile Age* 17, 30-35, July, 1953.

Dynel is an acrylic fiber, made from 60 per cent vinyl chloride and 40 per cent acrylonitrile. Its specific gravity is 1.31 at 81° F. Depending upon fiber denier, the tenacity is 2.5 to 3.5 grams per denier, wet or dry; elongation is 42-30 per cent.

Dynel has a high resistance to water. Stabilized Dynel fabrics are dimensionally stable in boiling water, and in dry heat up to 240° F.

The fiber is resistant to deterioration by chemical reagents. Possessing a high degree of resistance to a wide variety of inorganic acids, bases, and salts, it is unaffected by wool carbonizing treatments, normal bleaching methods, and the usual household and dry-cleaning chemicals. Its general resistance to industrial chemicals has led to many special uses in the chemical industry.

Dynel is also unaffected by hydrocarbons and most organic solvents. Acetone, cyclohexanone, and dimethyl formamide, however, are solvents in varying degrees; other cyclic ketones and certain amines exert solvent or swelling action at higher temperatures.

Like most of the modern fibers, Dynel is highly resistant to insects, mildew, fungus, and sunlight.

"Warmth without bulk" is a property resulting from the fiber's irregular-shaped cross-section; fabrics possess little weight but high insulating power.

A property unique with Dynel is its fire resistance, a quality that makes it

useful for drapery fabrics. In contact with an open flame, Dynel will burn, but is self-extinguishing when the flame is removed.

The natural color of the fiber is a light cream. This color may be diminished to a considerable degree by bleaching with an acid solution of sodium chlorite at temperatures above 194° F for short periods of time, or at lower temperatures by employing longer exposures. Other common bleaching agents are largely ineffective.

Almost any shade desired can be attained. Acetate-type dyes, selected acid dyes, a few direct dyes, some vats, and certain of the basic dyes have all been successfully applied to Dynel fibers and fabrics. It has been found that the cuprous copper employed in acid dye baths for deep shades forms a chemical bond between the dyestuff molecule and the acrylonitrile molecule. The dyebath temperature must be kept at 205° F or above.

In finishing, Dynel fabrics should be handled with full regard for the fiber's thermoplastic character.

The author mentions numerous consumer uses for all-Dynel fabrics and blends with rayon, acetate, wool, nylon, etc.—WHC.

The Fireproofing of Fabrics with Phosphorus-Resin Compounds

"Textile Chemist", *Textile Recorder* 70, 79-80, April, 1953.

In recent years, considerable attention has been given to the question of fire hazards in the use of textile materials for domestic and industrial purposes and for war equipment, and many attempts have been made to devise processes for making such materials resistant to flaming and to afterglow.

The two most difficult problems are to provide a treatment which gives a reasonably permanent result, particularly to washing or at least to leaching with water, and which also involves the use of such small quantities of the substance employed that the handle and other characteristics of the fabric or garment are not seriously impaired or changed. An additional difficulty is that some treatments having useful features suffer from the defect that they prevent either flaming or afterglowing but not both.

For a fireproofing treatment to have a permanent effect it is generally necessary for a water-insoluble substance to be deposited in the material, or, alternatively, the product applied must be capable of chemically combining with the fiber substance to give a reasonably stable compound, such as, for example, in the case of cellulosic fibers, an ester which is resistant to hydrolysis.

One of the earlier methods for fireproofing textile materials based on the use of water-insoluble compounds was that of Perkin, who suggested that stannic tungstate be formed within the fibers by double decomposition between sodium tungstate and stannic chloride. Subsequently, other insoluble metal compounds, of which antimony oxide is perhaps the most important, were proposed as alternative fireproofing agents of this type.

Combinations of antimony oxide and chlorinated organic substances, especially when there is also present a substance such as zinc borate to reduce afterglowing, are fast to washing and give good protection to the textile material against both flaming and afterglowing.

For fireproofing substances capable of chemically combining with the fiber, the most success has been obtained with the phosphorus compounds. The well-known Bancroft process consists of impregnating cotton fabric with a mixture of one part of phosphoric acid and one to four parts of urea, drying, and then curing at 130-175° C. The basic character of the urea serves to reduce the acidity in the textile material during the curing. It has, however been recorded that under such conditions a tendering of up to 15 per cent may be expected.

To avoid this tendering, the Monsanto Chemical Company propose to make use of an insoluble phosphorus compound of alkaline reaction, made by condensing phosphorus oxychloride with ammonia. When such a condensation product is applied to textile materials, together with a synthetic resin (a metal oxide such as antimony oxide may also be usefully incorporated in the impregnating liquor) these materials become resistant to flaming and to afterglowing. Since the condensation product and the resin are non-acidic, there can be no undesirable tendering in fireproofing acid-susceptible materials in this way.

The preparation of the condensation product (covered by U S P 2,596,935-2,596,939) and its probable chemical composition are described by the author.

Tendering of Wool Goods

Anon, *Textile Mfr* 79, 321-4, June, 1953.

There is little doubt that light of short wave length (between 3900 and 2950 Å) is most harmful to fibers. In the early stages of exposure, wool becomes slowly acid with progressive acceleration and exhibits a slower rate of shrinkage when fulled. A 25 per cent breaking strength loss may be observed after 200 hours in a Fade-Ometer. Further loss of strength may be noted when wool is washed after exposure to light. Chrome-dyed wool is stated to withstand light exposure better than acid-dyed wool or scoured material.

Damage to the epidermis of wool fibers caused by sunlight has been confirmed by colorimetry and is shown to be accompanied by breakage of cystine linkages. This leads to tippy dyeing.

The injury done to textile fibers during drying may be either of a mechanical or a chemical nature. The author states that wool fibers are injured just as much by over-prolonged drying, even at medium temperature, as by a rapid drying process at over-high temperature.

Poor rinsing after alkaline scours, followed by high-temperature drying, may lead to yellowing and tendering.

Wet chlorination, or treatment of wool in acidified baths of sodium hypochlorite, may produce serious tendering if not properly controlled. The main reason for this is the great affinity of wet wool for chlorine.

The wool substance is very reactive to chemicals of all kinds, and rapid modification may be brought about also by bleaching with peroxide and stripping with reducing agents of the zinc formaldehyde sulfoxylate type. Chemical processing of any of these types causes wool to exhibit increased rates of penetration by dyestuffs, mainly as a result of cuticle degradation.

The author quotes an article stating that the metachrome process of dyeing does less harm to the wool fiber than acid dyes or chrome dyes applied by different processes. One reason for the superiority of the metachrome process is said to be the fact that the pH of the dyebath is close to the pH at which wool is least damaged at the boil, i e, 5.5. However, the normal metachrome process will damage wool unless precautions are taken to prevent a rise in pH value.

In discharge printing, the author mentions that the discharged places on a wool fabric are much more liable to be tendered by light than undischarged places, and this applies with particular force to chlorinated materials.

Stripping with excessive amounts of chrome and sulfuric acid has been known to give rise to serious tendering of wool. It is better to strip dyed goods with reducing agents.

The author also discusses various methods of determining wool damage.

Sixteen references to the literature are cited.—WHC.

Proceedings of the
American Association of Textile Chemists and Colorists

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Editor of Proceedings: Carl Z Draves, 30 Lahey St, New Hyde Park, N Y

JANUARY 18, 1954

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EMPLOYMENT REGISTER

This column is open for two insertions per year, per member, without charge. Blanks can be obtained from, and filed with, the Secretary of the Association, Lowell Textile Institute, Lowell, Mass. It is understood that these will be open to inspection by prospective employers who can obtain further information from the Secretary.

53-34

Education: chemistry & dyeing, R I School of Design.
Experience: overseer of dyeing, cotton, rayon and blends.
Age: 46; married; references; position as piece dyer in northeastern U S desired.
1-4, 1-21

53-35

Education: textile school, evening classes.
Experience: textile mill chemist, woolen and worsted.
Age: 56; married; references; mill being closed, would like position in eastern U S.
1-4, 1-21

53-36

Education: Ph D, organic chemistry.
Experience: research chemist, dyestuff application in dyeing and printing, all types of dyes on most fibers.
Age: 63; woman; unmarried; references; desires position in laboratory or dyehouse, dyestuff manufacturer or technical service; New York or New England preferred.
1-4, 1-21

53-37

Education: B S, textile chemistry.
Experience: textile stylist and sales.
Age: 28; married; references; position as textile technician or stylist or in converting desired, New York area.
1-4, 1-21

53-38

Education: college in chemistry, dyeing and production management.
Experience: dyehouse laboratory.
Age: 24; single; references; work in dyeing and finishing desired; east coast preferred but not essential.
1-4, 1-21

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Membership cards have now been mailed to all members who have paid their dues. Any member not receiving his card within two weeks of payment should notify the Secretary:

Dr H C Chapin, Secretary
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CALENDAR

COUNCIL
1954—Jan 22 (New York), Apr 30 (Atlantic City), June 15, Sept 15, Nov 19.
1955—Jan 21, Apr 15, June 17

NATIONAL CONVENTIONS
Sept 15-18, 1954 (Atlanta Biltmore, Atlanta, Ga); Sept 21-23, 1955 (Chalfonte-Haddon Hall, Atlantic City, N J).

HUDSON-MOHAWK SECTION
Jan 22 (Albany); March 5; April 9, May 14 (Albany); June 18 (Outing).

MID-WEST SECTION
February 13 (Hotel Bismarck, Chicago, Ill).

NEW YORK SECTION
Jan 29, Feb 26 (Hotel Statler, N Y); April 23, May 21 (Swiss Chalet).

NORTHERN NEW ENGLAND SECTION
Feb 12 (MIT Faculty Club, Cambridge, Mass); Apr 9 (Lowell Tech, Lowell, Mass); June 11 (Outing—Merrimack Valley C C, Methuen, Mass); Oct 8 (Colonial C C, Lynnfield, Mass); Dec 10 (Woodland Golf Club, Auburndale, Mass).

PACIFIC SOUTHWEST SECTION
Jan 29.

PIEDMONT SECTION
Jan 30 (Hotel Poinsette, Greenville, S C); Apr 10 (Hotel Roanoke, Roanoke Va); June 11-12 (Outing, Mayview Manor, Blowing Rock, N C); Sept 11 (Hotel Barringer, Charlotte, N C).

Feb 26, Apr 9 (Kugler's Restaurant, Philadelphia, Pa); May 21 (Outing—Manufacturers Golf & Country Club, Oreland, Pa); Sept 24, Oct 29 (Penn-Sherwood Hotel, Philadelphia, Pa); Dec 3 (Kugler's).

RHODE ISLAND SECTION
Jan 28 (Providence Engineering Society, Providence, R I); Feb 25 (Johnson's Hummocks Grill, Providence); Mar 25 (Prov Eng Soc); Apr 29 Wannamoisett Country Club, Rumford, R I); June 11 (Outing—Wannamoisett C C); Oct 14 (Johnson's); Dec 2 (Annual Meeting—Sheraton Biltmore, Providence, R I).

SOUTHEASTERN SECTION
Mar 27 (Ralston Hotel, Columbus, Ga); May 14-15 (Outing—Radium Springs, Ga); Dec 11 (Atlanta-Biltmore, Atlanta, Ga).

WESTERN NEW ENGLAND SECTION
Jan 29, Mar 19 (Rapp's Restaurant, Shelton, Conn); May 14 (Ladies Night—Waverly Inn, Cheshire, Conn); June 18; Oct 1, Nov 12, Dec 10 (Rapp's).

Piedmont Section to Meet Jan 30

THE Piedmont Section will hold its Winter Meeting at the Poinsett Hotel, Greenville, S C, on January 30.

Edward A Murray, Chairman, will preside over the morning research meeting, which will be followed by the officer's luncheon.

Featured speaker of the afternoon technical session will be Sidney M Edelstein, Dexter Chemical Corporation, who presents a paper on "The Historical Development in the Bleaching and Dyeing Industry".

At the evening banquet session, Warren Foster of the Atlanta office of the Coca-Cola Company will be the guest speaker.

THE APPLICATION OF VAT DYES

Monograph No. 2 of the

American Association of Textile Chemists and Colorists

"The group of fifteen editors responsible for this monograph consists of a well-balanced cross-section of American industry concerned with the production, marketing and application of vat dyes. The AATCC is to be congratulated on the production of a comprehensive survey of American vat dyeing and printing practice which is the major theme of this application . . . the book will be useful as a work of reference at this side of the Atlantic and as a working manual for the American colorists for whom it was designed. . . . If a clear account of American practice is required . . . the enquirer *must* have access to this volume".—*JOURNAL OF THE TEXTILE INSTITUTE* (England).

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AND COLORISTS**

P O BOX 28, LOWELL, MASSACHUSETTS

1953 Intersectional Contest——

THE TEAR STRENGTH OF RESIN-TREATED TEXTILES*

PIEDMONT SECTION

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One cotton fabric and two rayon fabrics were treated with various amounts of UF resin and softener. These fabrics were then tested for tensile and tear strengths using a wide variety of methods, some of which have not been reported heretofore. The results indicate that some of the tear tests are a more accurate and sensitive index of quality than the tests that are more commonly used in the industry. Data shows the effect on strength of varying amounts of resin. The use of softeners are shown to improve tear strength.

INTRODUCTION

EVERYDAY experience has shown that textiles frequently fail by snagging on some object which causes a rip or a tear. Although this cause of failure has been recognized as a problem worthy of scientific investigation for half a century *(17)*, it is still being studied extensively. Recent investigations made by the US Army Quartermaster Corps *(15, 25)* show that tearing is a prevalent and fundamental cause of damage to fabrics. Today, as chemical treatments of fabrics grow in importance, this problem of tear strength of fabrics is becoming more critical *(24, 26, 16)*. Some of these chemical treatments are simple coatings, such as starching, rubberizing or flame proofing, which affect the exterior of the fiber. Other treatments, such as softening, resin treatment for crush resistance and acetylating, involve changes produced within the fiber. However, during most treatments, the tear strength is affected to a greater or lesser degree *(19)*. It has been shown that the fiber used and the fabric geometry can affect the tear strength *(14)*.

Thus, it is seen that the tear strength of textiles is a major problem, and that the tear strength is indicative of performance and is sensitive to changes in the fabric. If this is so, then why is not a tear-strength test used for most quality-control work? The answer to this question is partly one of inertia: the tensile-strength test is used by so many concerns that it is difficult to switch to another test. We believe that the answer also lies in the fact that tensile tests can be reproduced easily with good agreement between different laboratories, and this has not been generally true in the past for tear-strength tests.

Finally, it must be recognized that the accumulation of a large quantity of tensile-strength data provides a background of knowledge, which is lacking in the case of tear strength. The object of this research project was to investigate the use of a tear test as an index of fabric quality. It was felt that this objective could be achieved best by (a) determining what is the most suitable type of tear test to use, (b) presenting data that can give a background of information on tear strength and (c) focusing attention on the fact that tear strength is an important aspect of fabric quality.

Our efforts were concentrated on textiles treated with resins for crush resistance because there is widespread interest in this field, and the tear strength is particularly critical on such fabrics. Thus, the manufacturer of these fabrics is often faced with the difficult problem of wanting more crease resistance, and, at the same time, of being afraid that the garment may rip at the seams the first time it is worn. An interesting sidelight to this problem is that, for washable fabrics that are resin treated, if the initial wear period can be passed safely without rips, the garment will frequently last longer than the untreated fabric†. This gives a strong indication that, if a reliable test were available for tear strength, the producers of resin-treated textiles could produce a better and more uniform material. It was also our feeling that a project dealing with resin-treated textiles is of proper concern to the AATCC, whereas the general field of textile testing should be the province of the ASTM.

Because of the many different applications for tear tests and because of the lack of general information on this subject, a bibliography is attached, which contains many references to tear testing that were not actively used in the preparation of this paper but which nevertheless may prove of value to other researchers.

* Presented at the Conrad Hilton Hotel in Chicago on Saturday, Sept 19, 1953.

† This is believed to be due to the reduced swelling in water of resin-treated fibers. Therefore, the resin-treated fibers will not be damaged as much during the washing operation.

TABLE I

FABRIC A——PLAIN-WEAVE COTTON

	W*	F	W	F	W	F	W	F
Nominal Resin, %	none		4		8		8 (Softener)	
Tested resin, %	..		2.9		6.7		7.2	
Weight, oz/sq yd	3.42		3.33		3.44		3.54	
Yarn Size	33.0	38.8						
Yarn Crimp	4.2	14.2						
Crease-Rec Angle, °	75	90	120	115	125	135	128	128
Thread Count	88	75	83	78	84	77	85	78
Grab Tensile, lb	64.0	48.5	49.9	35.2	47.2	34.4	40.5	32.6
Variation, %	6.3	18.6	6.0	19.9	6.4	20.3	12.3	30.7
Rating	100		73		71		67	
Grab Elong, %	9.3	27.3	8.6	16.4	7.4	15.9	6.4	14.5
Variation, %	36.6	16.8	31.4	24.4	32.4	10.7	20.3	32.4
Rating	100		60		58		53	
Grab Work to Rupture	5.9	13.3	4.3	5.8	3.5	5.5	2.6	4.7
Variation, %	35.1	31.5	30.0	22.3	31.8	21.2	26.4	20.7
Rating	100		43		41		36	
Strip Tensile, lb	49.9	32.1	36.6	24.2	34.8	24.4	30.7	25.1
Variation, %	6.8	13.8	18.4	12.1	12.4	9.6	20.3	13.5
Rating	100		75		76		78	
Strip Elong, lb	9.0	20.5	8.4	13.7	7.4	12.9	7.3	13.7
Variation, %	7.3	13.0	15.4	10.8	8.2	10.6	10.7	7.4
Rating	100		67		63		67	
Trapezoid Tear, lb	4.0	3.2	2.9	2.3	2.6	2.0	2.9	2.0
Variation, %		7.6		9.8		..		..
Rating	100		72		63		63	
Tongue Tear, lb	2.0	1.4	1.4	1.0	1.2	1.0	1.5	1.0
Variation, %		7.1		..		..		..
Rating	100		71		71		71	
Double Tongue, lb	3.6	3.0	2.3	1.3	2.0	1.0	2.9	1.5
Variation, %	4.6	11.4	11.5	16.3	6.1	7.1	10.1	7.2
Rating	100		45		33		51	
Elmendorf, lb	35.0	23.2	22.8	13.4	19.2	12.8	25.2	15.2
Variation, %	5.7	8.6	8.8	14.9	15.6	23.4	19.8	6.6
Rating	100		58		55		64	
Impact Tear, lb	20.9	17.9	17.7	14.3	15.6	12.3	18.1	14.1
Variation, %	3.4	5.9	3.6	3.1	4.1	3.6	5.7	5.9
Rating	100		80		69		79	
Burst Test, lb	98.9		82.9		80.7		69.1	
Variation, %	24.1		7.8		12.6		13.1	
Rating	100		94		81		70	

* W, warp; F, filling

TABLE II

FABRIC B——PLAIN-WEAVE RAYON

	W	F	W	F	W	F	W	F	W	F
Nominal Resin Content, %	none		4		8		16		16 (Softener)	
Tested Resin, %	..		3.3		6.8		14.0		15.9	
Weight, oz/sq yd	5.36		5.46		5.51		5.82		5.71	
Yarn Size	21.9	16.8								
Yarn Crimp	10.0	17.5								
Crease-Rec Angle, °	100	95	123	123	118	118	145	135	125	128
Thread Count	6.6	63	65	62	65	61	64	60	65	61
Grab Tensile, lb	70.9	55.5	72.3	57.1	73.4	56.0	71.8	57.2	80.8	73.2
Variation, %	8.5	9.0	8.3	14.0	19.1	19.6	15.3	28.0	11.1	9.6
Rating	100		103		101		103		132	
Grab Elong, %	22.1	32.0	17.9	27.9	16.0	25.9	13.3	24.4	14.0	26.8
Variation, %	10.4	10.3	19.0	10.8	33.1	16.6	15.0	13.9	10.0	11.2
Rating	100		87		81		76		84	
Grab Work to Rupture	15.7	17.8	13.0	15.9	11.7	15.1	9.6	14.0	11.3	19.6
Variation, %	15.1	17.2	24.3	25.5	30.4	32.6	27.8	35.7	18.9	24.0
Rating	100		89		85		79		110	
Strip Tensile, lb	56.7	47.1	64.5	46.9	63.6	47.5	63.9	41.6	69.6	55.9
Variation, %	8.4	7.5	7.3	8.3	8.5	11.0	5.0	7.6	7.5	13.5
Rating	100		99		101		88		109	
Strip Elong, lb	22.3	30.7	19.5	29.1	17.1	26.3	14.4	24.4	14.6	25.5
Variation, %	8.0	7.9	6.7	7.9	5.7	5.0	6.1	13.2	7.1	9.6
Rating	100		95		86		80		83	
Trapezoid Tear, lb	6.3	6.1	6.7	5.7	6.5	5.6	5.0	4.3	7.9	7.0
Variation, %		3.7		4.4		6.9		7.4		11.2
Rating	100		94		92		71		115	
Tongue Tear, lb	2.0	2.0	2.1	1.9	2.1	2.0	2.0	1.9	4.4	4.1
Variation, %		..		6.5		..		6.5		5.5
Rating	100		95		100		95		205	
Double-Tongue Tear, lb	4.7	3.7	4.6	3.6	4.1	3.2	3.8	2.6	10.5	9.6
Variation, %	11.9	4.5	7.9	5.5	7.0	10.1	4.7	6.0	5.8	6.6
Rating	100		97		87		70		261	
Elmendorf Tear, lb	39.0	30.4	36.4	27.8	35.8	25.6	29.4	21.2	63.0	50.4
Variation, %	12.8	4.1	11.0	10.8	19.6	7.8	10.2	14.2	11.1	11.9
Rating	100		92		84		70		164	
Impact Tear, lb	27.8	23.3	26.3	22.4	25.0	21.1	22.5	18.8	40.8	30.4
Variation, %	4.6	5.1	5.1	5.3	2.5	2.6	4.2	3.4	4.5	6.9
Rating	100		96		90		81		130	
Burst Test, lb	125		116		111		109		108	
Variation, %	4.5		5.7		5.8		3.8		4.9	
Rating	100		94		89		88		87	

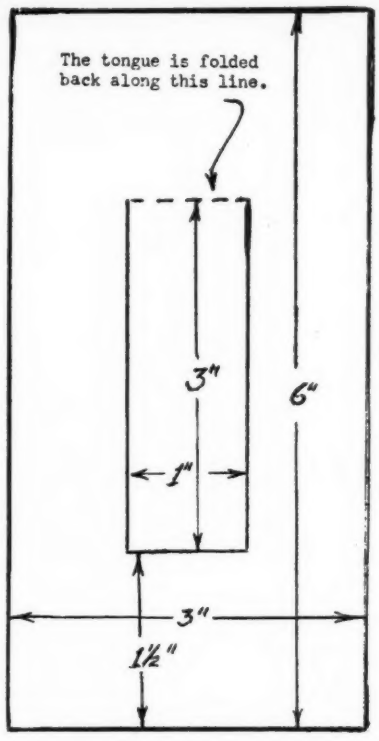

Figure 1

EXPERIMENTAL

MATERIALS USED ——— Three different fabrics were used in this test. These fabrics are typical types commonly used in the industry. They are described in detail in the tabulation of the data. They were selected so as to provide a range of weight, material and weave. Fabric A is a plain-weave cotton, fabric B is a plain-weave rayon, and fabric C is a gabardine-weave rayon.

The resin used for treating the fabrics was a commercial urea-formaldehyde cream (Aerotex 450).

The softener used was a cationic type, alkylimidazoline hydroacetate (Onyxsan S, USP 2,200,815).

TREATING METHOD———After being desized, the fabrics were padded with solutions of various concentrations of resin and softener. They were then dried in an enclosed tenter frame with the temperature at approximately 265°F. The goods were next cured for a period of five minutes at 300°F. After the cure, the goods were washed with a light soaping in ammonia plus a synthetic detergent, dried and framed to width.

The goal for the resin and softener add-on (nominal resin content) were as follows: (A) no treatment, (B) 4% resin, (C) 8% resin, (D) 8% resin plus 1% softener, (E) 16% resin and (F) 16% resin plus 1% softener.

Figure 2
The operator is inserting the sample in the Impact Tear Tester. In operation, the heavy pendulum is allowed to fall, and at the bottom of its swing it starts to tear the specimen. Tear strength is measured by height of pendulum swing after sample is torn.

TESTING METHOD ——— The work done by the Research Committee of the Piedmont Section and reported at the National Convention in 1952 indicated that a period of aging was necessary for resin-treated textiles in order to obtain consistent test results. Because of this, we aged all of these goods together for two weeks, and then various samples were sent to the participating laboratories, where the samples were conditioned for a minimum of 72 hours at 70°F and 65% RH before any testing was done.

For each of the following-type tests, a total of ten samples were tested on each material. Where the material was tested in both the warp and filling direction, ten tests were made in each direction. The results given are the average of these ten tests. The results for the tested resin content were for one test only. The particular strength tests used were selected because each has been proposed in the past as a desirable test for tear strength.

1) *Resin content.* ASTM D 629-46T.

2) *Crease-recovery angle.* Monsanto method.

3) *Yarn size.* ASTM D 508-43.

4) *Thread count or fabric construction* ASTM D 39-49.

5) *Fabric weight.* ASTM D 39-49.

6) *Grab tensile.* ASTM D 39-49.

7) *Grab elongation.* ASTM D 39-49.

8) *Raveled-strip tensile.* ASTM D 39-49.

9) *Raveled-strip elongation.* ASTM D 39-49.

10) *Trapezoid tear.* ASTM D 39-49.

11) *Tongue tear.* ASTM D 39-49.

12) *Diaphragm bursting test.* ASTM D 231-46 on a Muller testing machine.

13) *Crimp.* ASTM D 39-49.

14) *Elmendorf tear.* Federal specifications for textiles testing CCC-T-191b dated May 15, 1951. See Section IV, Part 5, Method 5132.

15) *Seam strength.* Fed Spec Section IV, Part 5, Method 5110.

16) *Double-tongue tear.* A sample 3" x 6" is cut with a 1" x 3" rectangular cut on all but one short side in the center of the sample to form a tongue (Figure 1). This sample is inserted into a tensile testing machine, which has 1" x 3" jaws, so that the tongue is clamped in one jaw and the sample end in the other. The tear is then a continuation of the cut. The highest reading obtained is recorded as the tear strength. Thus, this test is similar to the ASTM tongue tear except that the sample is cut differently.

17) *Impact tear.* A sample is cut as described above for the double-tongue tear. This is inserted into the tester shown in the photograph, so that the tongue is clamped in one jaw and the sample end

TABLE III

FABRIC C—2/1—GABARDINE-TWILL RAYON

	W	F	W	F	W	F	W	F	W	F
Nominal Resin Content, %	none		4		8		16		16 (Softener)	
Tested Resin Content, %	..		3.4		7.4		13.8		15.5	
Weight, oz/sq yd	6.39		6.38		6.79		6.78		6.80	
Yarn Size	20.2	18.5								
Yarn Crimp	10.8	4.2								
Crease-Rec Angle, °	105	95	112	122	109	128	120	135	135	150
Thread Count	103	56	102	55	102	55	102	54	102	55
Grab Tensile, lb	121	64.0	128	62.3	127	70.1	125	63	136	61
Variation, %	8.2	14.1	7.1	19.3	10.2	30.0	6.4	11.2	2.9	11.5
Rating	100		97		109		98		95	
Grab Elong, %	33.1	21.4	29.2	19.2	26.0	17.1	21.9	14.5	24.4	14.2
Variation, %	10.0	9.4	7.9	19.3	15.4	9.9	15.1	37.2	12.3	19.0
Rating	100		90		80		68		66	
Grab Work to Rupture	40.0	13.7	37.4	12.0	33.0	12.0	27.4	9.1	33.2	8.7
Variation, %	14.2	17.3	12.4	21.1	21.7	26.5	17.6	30.8	14.9	25.0
Rating	100		88		88		66		63	
Strip Tensile, lb	100.9	59.7	107.4	60.5	107.4	57.8	104.3	53.0	108.3	60.9
Variation, %	5.7	3.1	6.3	3.7	5.1	4.6	2.5	3.5	7.1	6.8
Rating	100		102		97		89		102	
Strip Elong, %	27.5	22.4	25.5	19.6	21.0	17.0	19.1	13.9	18.4	14.1
Variation, %	5.8	2.8	4.5	6.0	5.2	4.1	7.9	9.9	9.1	3.9
Rating	100		87		76		62		63	
Trapezoid Tear, lb	16.8	7.7	17.3	7.7	14.4	6.1	11.5	5.7	15.6	7.1
Variation, %		7.8		5.2		6.1		9.0		6.1
Rating	100		100		79		74		92	
Tongue Tear, lb	3.5	2.5	3.0	2.8	3.0	2.5	2.7	2.0	..	5.0
Variation, %	..	..	..	8.8	..	11.0	..	..	..	..
Rating	100		112		100		80		200	
Doub'e-Tongue Tear, lb	7.0	5.3	7.6	5.6	..	5.0	6.1	4.2	..	12.3
Variation, %	5.7	4.9	4.8	9.0		17.3	10.5	14.6		5.9
Rating	100		106		94		80		233	
Elmendorf Tear, lb	66.4	40.6	71.4	47.4	59.6	38.8	51.4	29.2	84.0	72.0
Variation, %	9.0	14.8	5.6	31.6	15.1	10.3	15.6	13.7	4.8	2.8
Rating	100		117		95		72		177	
Impact Tear, lb	43.2	30.7	..	30.2	..	25.7	..	21.5		46.6
Variation, %	5.5	9.2		5.3		5.8		5.7		4.8
Rating	100		98		84		70		152	
Burst Test, lb	151.4		147		142.2		138.7		132.1	
Variation, %	4.9		6.5		5.16		4.8		7.6	
Rating	100		97		94		92		87	

TABLE IV

	Sensitivity		Reliability		Adaptability		Total
	Score	Rank	Score	Rank	Score	Rank	Rank
Strip Tensile	2	1	8.5	4	1		6
Trapezoid Tear	38	3	6.8	5	2		10
Tongue Tear	27	2	..	3	3		8
Double-Tongue Tear	48	5	9.0	2	6		13
Elmendorf Tear	46	5	12.5	1	5		11
Impact Tear	47	5	5.2	6	4		15

in the other. The pendulum of the machine is allowed to drop and thereby rip the sample. The height of the swing of this pendulum, after tearing the fabric is determined by the energy absorbed by the sample during tearing. The readings obtained from this tester are inch pounds of work required to tear the three inches of fabric. (See Fig 2). Results with a similar tester have been described by Dickson and Davieau *(9)*.

DISCUSSION

The data obtained are so voluminous that it is difficult to study and evaluate them. Because of this, the results of each test were reduced to an equivalent figure called the rating. This rating is the test result expressed as a percentage of the value for the control, which was fabric without resin treatment. For example, the grab tensile strength in the filling direction of fabric A was 48.5 pounds for the untreated sample and 35.2 pounds for the fabric treated with 4% resin. This results in the untreated rating being (48.5 ÷ 48.5) x 100 = 100, and the 4% rating being (35.2 ÷ 48.5) x 100 = 73.

The next step in handling the data was to weed out certain tests that obviously gave illogical results. The discarded tests and the reasons for discarding them were as follows:

Grab Tensile——In the case of the rayons, no decrease in test value was found, although it is generally agreed that the material does lose tear strength.

Grab Elongation——A higher value was indicated for the filling than for the warp although the tear strength is just the reverse.

Grab Work to Rupture——Same as for grab elongation. For this figure we used the value of the grab tensile times the grab elongation rather than measuring the area under the stress-strain curve. The value thus obtained is closely proportional to the area under the stress-strain curve since the stress-strain curves were approximately straight lines of the same slope for a particular fabric. Because of the method of evaluating the results on a rating basis, the absolute values are not important.

Strip Elongation——Same as for grab elongation.

Burst Test —— The forces acting to cause a tear are different from those utilized in the burst test, and, therefore, correlation between this test and tear strength was not expected. Therefore, when it was found that this test did not reflect the improvement in tear strength due to the use of a softener, it was felt that sufficient justification existed for discarding this test.

Next, it was felt that the tear strength of the fabric was of major interest only in its weakest direction. In most commercial fabrics this will be the filling direction, and this was the case for these three fabrics. Therefore, only the data in the filling direction were considered. The other data are presented since it may be of value to some future investigator and will provide the background of information that was one of the primary objects of this investigation.

In evaluating the remaining data, it was felt that the data should be examined on the basis of three separate criteria. The first criterion was sensitivity. It was felt that the test should reflect a change in the tear strength of the fabric due to the chemical treatment. This sensitivity was evaluated by noting the difference between the ratings for fabrics with 4% and 8% resin content. The total sensitivity for the three fabrics was totaled for each test method and is shown in Table IV.

The second criterion was reliability. It was felt that the test should give reproducible results. The best measure available for this criterion was the coefficient of variation. All of the coefficients of variation for each test were totaled and averaged to obtain this figure. In doing this, we avoided calculating the data obtained from the tongue tear because this test gave such low readings that the limit of sensitivity of the machine prevented obtaining an accurate figure for the coefficient of variation.

The third criterion was adaptability. It was felt that the most adaptable test should be easy to perform on available equipment. It was also believed that the test could be adapted to the largest variety of fabrics if it duplicated the action encountered when normal fabric tears in use. Finally, it was felt that a plot of the rating versus the tested resin content should show a reasonable and logical trend in order to be adaptable.

After the data were examined for the above three criteria, each test method was given a certain number of points based on the number of other test methods exceeded. This scoring is similar to that used in match-point duplicate bridge tournaments. The results of the final scores are shown in Table IV.

The total scores for the various tests indicates that the presently used tests are not the most suitable. The strip tensile test obviously does not give an indication of tear strength. The tongue tear test as performed on standard equipment gives poor results because of the distortion of the specimen during the testing and the low forces required to cause failure. As the trapezoid tear has been widely criticized because of the varying effect caused by specimen shape, it should be looked at with suspicion, even though it has a medium ranking.

The Elmendorf tear test has a medium ranking, which indicates that it may be suitable. The fact that it is being used by a number of concerns is an incentive for further evaluation.

TABLE V

Material	Treatment	Seam Strength Warp	Seam Strength Filling	Filling Rating
80 x 80 Cotton	none	42.7	37.3	100
	4% resin	38	27.3	73
	8% resin	29	17.7	47
	8% resin & softener	35	23.7	64
Rayon Challis	none	39	36	100
	4% resin	38.7	36	100
	8% resin	36.7	38	106
	16% resin	35	34	94
	16% resin & softener	30	31	
Rayon Gabardine	none	49.3	40	100
	4% resin	46.7	39.7	99
	8% resin	45.3	39.3	98
	16% resin	42.7	28.0	70
	16% resin & softener	49.7	30.7	77

The two top-ranking tests use samples that are cut in a similar manner, which is called the double tongue. This shape of sample alleviates distortion of the material during a test and thereby produces results that are more reliable and more sensitive to changes in tear strength. The top-ranking test is an impact test, which may duplicate field conditions closer than the low-speed test. The low-speed test, called the double-tongue tear, counterbalances this advantage by being run on regular tensile-testing equipment rather than on a special machine.

The results obtained indicate that the Impact Tear Test is the best for use with resin-treated textiles. It would seem that a fruitful field of study was now opened up to determine if this test has equal utility in testing a wide variety of different fabric weights and different fiber materials.

All of these tests indicate that a cotton fabric loses tear strength as the resin content is increased. Most of the tests indicate that rayon fa rics also lose tear strength as the resin content is increased, but, in general, rayon fabrics are less affected than cotton. Thus, at 8% nominal resin content, the impact tear strength of the cotton has lost 31% of its original strength, while the plain woven rayon has lost only 10% of its original strength. This difference is believed to be due to the lower crystallinity of the rayon fiber, which can accommodate the inclusion of the resin without becoming brittle.

As certain of these tests are very sensitive to changes in resin content, they could be used as a good control method during the manufacture of resin-treated textiles. The Elmendorf Tear, the Double-Tongue Tear and the Impact Tear Test all are seen to provide better correlation with resin content than does the usual tensile test.

These tear tests also provide a better index to the quality of most fabrics than does a tensile test since many fabrics fail by tearing (*15*). Therefore, the best of these tests could be wisely adopted by the trade for all types of fabrics as a quality control test. An indication of this is shown in the fact that impact tear strength correlates quite well with the strength of a sewn seam, whereas there does not seem to be any correlation with the grab tensile strength.

As might be expected, the various tests indicate that the gabardine-twill rayon behaves differently from the plain-weave rayon during the tearing tests. Thus, in the slow-speed double-tongue tear, at a 16% nominal resin content, the twill has lost 20% of its strength, while the plain weave has lost 30%. However, with the faster rate and different conditions of the impact tear test, these relative positions are reversed with the twill losing 30% and the plain weave losing 19%. It is not within the scope of this paper to discuss possible causes of this phenomenon, but it can be seen that the techniques for testing and tabulating that have been developed during this project could be used for the investigation of the tear strength of a wide range of different types of fabrics.

With the exception of the burst test, all of these tests show a remarkable increase in tear strength with the inclusion of a softener. This has been known as a general fact to the trade, but it has not been generally realized that, in the case of rayons, the tear strength of the resin-treated fabric can be increased above its original tear strength by including a softener. Here again, tests for tear stength may show the method by which superior or more serviceable fabrics may be made.

In the above method of scoring, the test that gave the best results gets the higher rank. The rank of each of the three criteria are added to determine the total rank. This method of scoring indicates that the Impact Tear Test is the best over-all method.

ADDENDA

Further work on this project has shown that during the last part of the tear, the threads being torn have a tendency to unravel and slip out of the orthogonal threads. This effect is not consistent and, therefore, can lead to some variation in the test results. In order to overcome this effect, the samples are now being cut as indicated in the attached sketch which shows a half inch slit at the point where the tear is to terminate. A die is used to cut the test samples quickly and accurately. (See Figure 3).

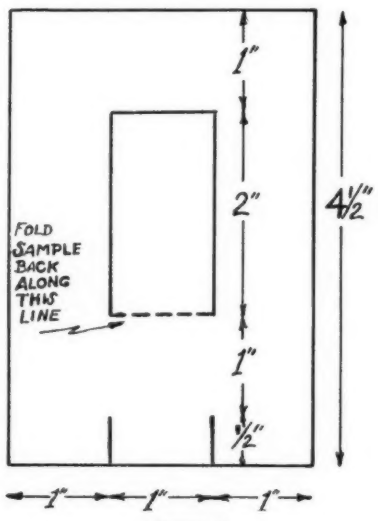

Figure 3

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ONE HUNDRED AND EIGHTY-NINTH COUNCIL MEETING

THE Council held its 189th meeting at the Hotel Commodore, New York, N Y, on Friday, November 20, 1953. Present were President J Robert Bonnar, presiding; Arthur T Brainerd, Arthur W Etchells, Samuel L Hayes and George O Linberg, Vice Presidents; Albert E Sampson, Treasurer; Leonard S Little, Chairman of the Executive Committee on Research; William D Appel, Carl Z Draves and C Norris Rabold, Past Presidents; Edward B Bell, Elmer E Fickett, Ernest R Kaswell and Frank J O'Neil representing Northern New England; Raymond W Jacoby, Thorwald Larson, Edward W Lawrence and Alden D Nute representing Rhode Island; Raymond J Carey representing Western New England; Carl H Brubaker, Charles W Dorn, Weldon G Helmus, Herman E Hager, Patrick J Kennedy, James J Marshall and Henry L Young representing New York; Carleton T Anderson, Edward C Diehl, Ange E Raimo, Ernest E Rettberg, Jr, Richard B Stehle and Percival Theel representing Philadelphia; Walter M Scott representing Washington; Raphael E Rupp and R Hobart Souther representing Piedmont; Arthur I Hultberg, Joseph H Jones and Samuel Klein representing Mid-West; Kenneth H Barnard and Eric W Camp of the Committee on Conventions; George L Baxter of the Corporate Membership Committee; William A Holst, Jr, of the Committee on Constitution and Bylaws; George H Schuler and Glenn D Jackson, Jr, of the Publicity Committee; Harold W Stiegler, Research Director; Jackson A Woodruff; and Harold C Chapin, Secretary.

The Secretary's report of the 188th Council meeting and financial report of October 30th and the Treasurer's report of November 9th, were accepted.

The President described a personal inspection of Association facilities and operations at Lowell, by a group consisting of himself and other executive officers, the four Vice Presidents and the entire Committee on New Personnel. The group continued its meeting in Boston, to discuss its impressions of Lowell, new personnel and finances. The contribution of the Association to the prestige of the Lowell Technological Institute had been freely recognized by those in authority at the Institute. It was agreed, however, by the group from the Association, that this was fully justified by practical advantages to the Association, both present and prospective, and that no move from this location would be contemplated.

The Treasurer discussed the assets, income and expenditures of the Association as shown in the report for the year ended July 31, 1953. Though this shows over $280,000 of investments and bank accounts, most of this amount is in funds held in trust or allocated to specific purposes, such as research, publications and prizes, so that less than $40,000 of this principal could be applied to general use by the Association. Receipts exceeded expenditures by $24,580, but after subtraction of advance payments for the *Colour Index* and other allocated funds, there remained but $4,054 which could have been used for new administrative purposes. The budget adopted last June for the current fiscal year promises deficits of such magnitude in special accounts so as not to leave enough for general operations at the present rate. Present administrative costs are based on the requirements of a smaller Association at the lower price levels of the past, and permit no further economies.

For the maintenance and expansion of general activities the Council had previously approved increased personnel. Mr Wood's Committee had reported on probable duties, salary and expenses. The four Vice Presidents had been asked, at the September Council meeting, to consider the cost of such in relation to present resources and further needs. Speaking for the Vice Presidents, as the result of their investigation, Mr Hayes recommended that annual dues for Senior and Associate members be increased from $7.50 to $10.00 per annum, beginning with the next dues year on November 1, 1954. This was approved as an amendment to the Bylaws, which was subsequently adopted by letter ballot of the entire Council.

Mr Wood's Committee on New Personnel, and Mr Hayes' on Dues, were thanked for their services. Authorized at the meeting, the President appointed a new committee to engage an Assistant Secretary. Its members are H L Young, Chairman, P J Wood, L S Little, A E Sampson and H C Chapin. Appropriations were voted for salary and expenses of the new office.

Mr Camp described some of the problems of the Chicago Convention, known at the time only to those who successfully solved them. The official registration was 1223, including about 900 by mail in advance. The financial report, not yet audited, would be satisfactory. The President was authorized to appoint a Treasurer for the Perkin Centennial Convention of 1956. On motion of Mr Jacoby, and subject to approval of the Committee on Appropriations, a loan of $2000 was approved for advance expenses of this convention.

Professor Theel reported favorable reviews on "The Application of Vat Dyes". About 900 copies have been sold. Books will be consigned to Sections by the Secretary, for sale at meetings, if local officers will be responsible for their sale or return. To keep down the size of the next *Year Book*, a smaller but equally legible type will be used in the membership list, and probably in other places. Following the retirement of Professor Phelps from the Committee on the American Dyestuff Reporter Award, Mr Dalton has become Chairman. Limitation of Intersectional Contest papers to one hundred pages each is under consideration.

Mr Baxter stated that bills for Corporate Membership dues in 1954 would be mailed the first week in December, to encourage payments within the 1953 calendar year. Every effort must be made to meet a research budget in excess of the present year's income.

The President announced that the Council meeting of January 22nd would be in New York; that of April 30 in Atlantic City if suitable arrangements could be made.

Presented by Mr Etchells, with approval of his Committee, each of the following was elected to the class of membership indicated:

CORPORATE

Amos Hosiery Mills, Inc
Avco Manufacturing Corporation

SENIOR

N W Abernethy
B Ajdukiewicz
B J Alport
T A Alspaugh
I J Altman
W T Ambrogi Jr
K D Ballou
M H Barnett
T R Barrabee
J F Barry
R I Bashford Jr
N J Battistelli
R H Beaumont Jr
A Bendelius
S D Bennett
J Berch
R L Bernstein
H H Birkby
J O Blinkhorn
A Bolgiani
A G Bruinier
E W Buskey
J J Byrne
G C Canipe
R A Conzett
H Cordeu
I Cornacoff
J W Crone Jr
C J Desmarais
M M diDario

S A Driggers
M L Driscoll
V L Erlich
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E D Frobenius
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D M Gaskill
C A Gerardi
J B Glazer
A S Goldberg
L A Graham
R M Gregg
R C Hall
R M Hopkins
J H Howard
E Hulton
F P Janstein
R C Johnson
W H Jones
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S Kanai
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R S Kent
F C King
K R Kirby
S Kobayashi
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J E Larkin
C E Lavin
R R Leeper
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E E Lineken
H A Lips
M Lipson
J E Londono A
H B Malone
H Margaretha
M J Marens
R E Mason
R Y McCarter
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J H McCormick
V I McLendon
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G E Michael
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S Ogawa
L M O'Guin Jr
W S Peck
F S Perkerson
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A L Polese
F M Prettie
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A W Probst
B T Pull
B L Quinton
A Reinhold
R C Riglian
D E Robertson
J R Robinson
E L Rodgers
F T Rodgers
J I Rodriguez
J C Royce
W E Rush
J A Salzano
J D Scanlon
D G Schulman
O Sedal
K W Selden Jr
L Sellet
R E Staples
J R Stewart
L L Stonely
J Szczech
C F Szely
A Szuna
J J Terranella
H M Thompson Jr
J C Thompson
H Toepffer
C P Tokarz
H K Townsley
J A Truitt
I C Tweedy
W F Underwood
H Uribe
W P Utermohlen Jr
R B VanOrder
R R Walker
J G Watson
R E Weber
C T White
M V White
C A Wilmot
B L Wood
A B Woodman
M Yonese

JUNIOR

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F W Bresette Jr
C T Burgess
P D Cunningham Jr
A Encinas
B R Ezzell
G H Fisk
G Garvey
M B Graham
M C Harmon
P P Harris, Jr
R D Hausman
A R Hoover III
S W Klein
R F Lederer
P C Lindenmeyer
J P Maclellan
P X Masciantonio
M R McCullen Jr
J B McNulty
R R Metzinger
J J Mitman
J M Perry
W Pofcher
A C Rezende
J E Rieke
I Safdeye
M F Santimauro
L S Shefter
F A Sheldon
H M Truax
W D Wirth
O Yeaton
R L Yobs

ASSOCIATE

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H Berman
B B Bilbao
H C Bullock
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M L Cowan
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W C Duckworth
T H Elder Jr
H W Gipson
G G Hacker
J E Hargreaves
A D Hicks
J Hill
D C Hoye
W H King
H S Kishbaugh
S T Lipsius
M Lonie
J Lorch
J F Marrs
E A McCafferty
W L Milheim
H K Mohr
M Montague
C L Partridge
C Reichman
W C Rutland
B A Sample
B Tabachnick
W L Thomson
V A Torrealba
H A Townsley
F C Whitfield
A Zambianchi

STUDENT

A Camacho
L J Challain
S Cohen
E J W Cote
J D Creveling
C J Cruz
V D'Alessandro
E P Damm Jr
F A Dawson
A F Deligiannis
L Y Duan
N L Eddy
M A Frishman
R J Fryer
W J Gamblin
W R Germer
R J Ghiorsi
A D Hammonds
R E Hardy
D L Harrison
E H Hinton Jr
F A Holzapfel
J Jacintho Jr
T W Jewell
M F Jones
B Joyal
C Kahn
J K Chi
J C Kennedy
W Kraus
R F Lafferty
I Landa-Abrego
S P Lothrop
W R Markey
D M Momany
D A Morris
M J Moster
E S Obidinski
W Pels
B M Phillips
W T Randall
R A J Ranieri
H M Robinson Jr
C R Ross
L M Rothman
M Samwick
J K Sanghrajka
S B Schader
H B Schreiber
A Slama
J W Smethers
A P Smith
M L Spruell
J D Stowe
M A Thomas
J L Twarog
O Ulgen
E West
R C Wilkins
W N West

Transferred from other classifications to Senior

A J Andrews
D J Ardito
E Artim
J H Blakely Jr
E W Boland
W J Broderick
G A Caron
M Charatz
S J Clark Jr
F H Cooper Jr
F Cutter
T H Dailey
D B Deaton
F K Gammons
D A Gardner
J M Goldston
L E Granahan
W B Guerrant
P A Gruber
W L Hammond
F Hewit
H A Horstmann
G H Kenyon
J E Kerr
L C Kolodny
R P Lehman
J J McGuinness
A J McNulty
G C Morel
C H Mueller
J R Nisbet
F T Norris
P W Oppenheimer
R W Schneider
V G Paul
E F Pierce Jr
T Pilblad
S L Robey
R S Sappington
B Scheffler
B Schneeweis
R A Stone
W R Strickel
E W Teague
F X Worden
P Theodos
Z S Touloukian
R E Townsend
F P Vagnini
J F Whalen Jr
E D Wielicka
W O Wilson
D Winslow
A I Wolpert
N F Young

Respectfully submitted
H C CHAPIN
Secretary

First Prize Winner——
1953 National Student Contest

DYEING UNION SHADES ON BLENDS OF DACRON OR ORLON WITH WOOL*

CLEMSON COLLEGE STUDENT CHAPTER

Committee
Lonnie T Howard, *Speaker*
Paul N Robinette
Charles B Simpson
Fitzhugh L Wickham

The dyeing of solid shades of good fastness properties on blends of wool with Dacron or Orlon is a very difficult problem. The authors have devised a method of dyeing vat dyes on such blends to obtain shades of good fastness to light, washing, drycleaning and crocking. A vat dye in dispersed-pigment form is padded onto a blend fabric in a composition containing, among other things, an acrylonitrile latex, and the fabric is dried. The latex fixed in drying permits fixation of the vat dye on the blend during subsequent reduction and oxidation.

The method has also been varied, where vat pigment is not firmly fixed on the wool in drying, by soaping off the pigment from the wool before fixing the vat dye and later dyeing the wool of the blend with any or the fast dyes suitable for wool alone.

INTRODUCTION

VAT dyeings of Orlon and Dacron, or a simple dyeing process of any type on the new synthetic fibers, Orlon and Dacron, has been desired by the textile industry since the introduction of these new textile fibers.

To date, the successful union dyeing of wool-synthetic (Orlon, Dacron) blends of these new fibers has been difficult, a condition the textile industry finds generally undesirable. The following quotation from one of the larger dyestuff concerns will illustrate this point *(1)*:

"With presently known techniques there is little that can be recommended for production of solid shades on Orlon-wool blends. The cuprous-ion method does not solve the problem since the wool absorbs the acid dyes at the expense of Orlon. It seems that, at present, stock dyeing and blending of the dyed fibers is the best method."

Since this is true, good dyeings in solid shades by processes now in operation are costly and inefficient. This is also true of Dacron blends, for penetrants and swelling agents must be used to assist in the dyeing of this fiber unless elevated temperatures are employed.

EXPERIMENTAL

In attempting to find a practical method of dyeing these blends, we used two different approaches: first, the production of solid shades on the wool and synthetic fibers with a single class of dyestuff, and, second, reaching this same objective by using more than one class of dye, that is, by cross dyeing.

The blends used in this research were 55% synthetic (Dacron or Orlon) and 45% wool. All the Dacron-wool samples were plain weave but, because of a limited supply, a portion of the Orlon-wool blends were plain weave and the remainder a twill construction. Also, for information, samples of straight Dacron and straight Orlon were included in some of the work.

Preliminary experiments showed that small amounts of acrylonitrile latices, when present, on the above synthetics alone, or in blends increased the pick-up of several classes of dyes rather markedly. The latex could be bonded very securely to the synthetic fibers, and union shades could be obtained between the synthetics and wool.

Our tests indicated early in the work that padding the various types of colors together with the latex, and then drying, gave better coverage and penetration than pretreating the goods with latex alone and then applying the dye. The first procedure was therefore followed in all the subsequent trials with the above fabrics.

PROCEDURE———The same general procedure was employed in all this work, the goods were first padded in the following formula:

Parts	
10.0	latex (30% solids)
0.5	ammonium hydroxide
10.0	ammonium tartrate (10%)
0.1	wetting agent
0.5 to 75.0	color
78.9 to 4.4	water
100.0	total

For information, companion paddings were carried out with the above general padding mixture with the following variations:

(a) Omitting the latex and the ammonium compounds.
(b) With the addition of small amounts of a cationic agent.

UNION SHADES WITH ONLY ONE CLASS OF DYE———Union shades were obtained with vat colors alone or with acetate colors alone. The latter gave such unpromising fastness on the wool component, however, that this part of the work was limited to vat dyes.

In dyeing vat dyes the pigment was padded with the latex mixture, and, after drying the color was reduced in a long bath as follows:

Per Liter
2 g caustic soda
2 g hydrosulfite
2 to 10 g Marasprese N
1 to 2 g vat -color paste

A range of reduction temperatures, 104, 140 and 194° F (40, 60 and 90° C) was investigated with variations in time of 30 seconds to 1 hour. After dyeing, the goods were finished by rinsing, oxidizing and soaping, as is usual for vat colors.

UNION SHADES EMPLOYING MORE THAN ONE CLASS OF COLOR——— In producing unions by cross-dyeing, pigments in the regular water dispersible form for printing and dyeing were padded with the latex mixture and dried as before. This bonded the insoluble colors rather securely on the synthetics, but some colors less securely on the wool. Where the latter proved to be true, the goods were soaped and rinsed to remove the unfixed pigment from the wool before the cross-dyeing process.

There appears to be a rather wide selection of colors for cross-dyeing, since acid dyes, metallized dyes, acid mordant dyes, and soluble vat dyes were all used satisfactorily by their regular formulas in these experiments.

RESULTS———In summing up the results of this research, the following facts seem important:

* Presented by Lonnie T Howard at the Alumni Luncheon, held on Thursday, September 17, 1953, at the Conrad Hilton Hotel, Chicago, Illinois, during the 1953 Convention of the AATCC.

1) The shades produced by the vat-color method of padding with latex and color and then reducing gave union shades which appeared closely to parallel the shades of the same dyes on cotton or wool in fastness to washing, dry cleaning, crocking and light.

2) The paddings made with the same colors without latex gave poor yields and unions when the vat colors were reduced.

3) The paddings made with the addition of small amounts (0.01 to 2 parts) of cationic agents gave varying results with the individual dyes. This addition was helpful with the Vat Blue BF type, but interfered with the unions of several other colors.

4) The lignin sulfonate (Mar-sperse) was extremely important in controlling the union of the synthetic and wool. Some colors, such as Vat Navy, gave solid shades with a minimum of this product, while others, such as Vat Red C2B, required comparatively large quantities of the lignin product to prevent the wool taking most of the color at the expense of the Dacron or Orlon.

5) In variations of reduction conditions we found that reduction at 140° F (60° C) for ½ hour gave the best all-around results. Reduction at 194° F (90° C) for ½ minute gave the deepest shades and best unions with many colors, but the dyeings showed inferior crock fastness. Reduction at 104° F (40° C) gave poor color yields and unions.

6) Of the assistants used, ammonium tartrate and similar agents improved the penetration and brightness of the resulting dyeings, apparently by the formation of acid during drying with an accompanying improvement in latex coagulation.

7) For padding before cross dyeing, both ordiary water-dispersible pigments and unreduced vat-color pastes were satisfactory. The intermediate soaping step proved to be less necessary with the latter than with the former.

The fastness of the shades produced by this cross-dyeing method varied with the colors which were csed for covering the wool after the padding operation. This was to be expected because of the wide range of dyes that proved suitable for this cross-dyeing.

8) Acrylonitrile-butadiene latices proved superior to acrylonitrile-styrene latices in comparative trials.

9) Preliminary trials made with Acrilan and Dynel indicated that similar results to those on Dacron and Orlon may be possible with these fibers. Time did not permit a more detailed study of these two synthetics.

CONCLUSION

This research gives promise of a possible practical method of producing fast colors on woven or knitted goods of various synthetics, either alone or blended with wool.

Since the critical factor in this process is the latex necessary to give proper color affinity, and since various latices of this kind have been successfully applied to goods of cotton, viscose and acetate for apparel use, this type of product may be practical for other fibers as well *(2)*.

The acrylonitrile-butadiene latex used in most of this work contained 30 to 40% solids and had a particle size of 600 A°. We believe that a more detailed study of latex type and methods of coagulation on a variety of fibers would be worthwhile as a future project.

REFERENCES

(*1*) Allied Chemical and Dye Corporation, "The Coloring of Post-War Synthetic Fibers", page 8.
(*2*) B F Goodrich Chemical Co, Service Bulletins H-9 (Jcne, 1952) and H-12 (November, 1952).

Membership Applications

December 30, 1953

SENIOR

Bruno M Baer—Supt of Dyeing, Printing, Finishing Dept, Oy Finlayson, Forssa, Finland. Sponsors: R C Nelson, C H M Moring.

David H Haigh — Dyeing & finishing, Fabric Sales Div, E I du Pont de Nemours & Co, Inc, Wilmington, Del. Sponsors: R J Ellis, P de Mallie.

Xavier Kowalski—Textile chemist, Waldrich Co, Delawanna, N J. Sponsors: A W Visochi, E Szlosberg.

William Kunedt—Chief chemist & dye tech, Pioneer Flag & Decorating Co, San Francisco, Calif. Sponsors: W J McLaughlin, H B Fenn, Jr.

Fred Langford—Assistant supt, bleaching & finishing, Erwin Mills, Inc, Durham, N C. Sponsors: E P Henley, C N Rabold.

Albert R Martin—Senior research chemist, National Institute of Drycleaning, Silver Spring, Md. Sponsors: R T Graham, E R Clark.

Carlos J Pospisil—Technical mgr, Cia Industrial La Pastora, S A, Puebla, Mexico. Sponsors: G A Slowinske, J H Bailey.

Herbert Sieben — Manufacturer's agent, The Christian Company, Richmond, Va. Sponsors: W D Livingston, D Kaufman.

Penn F Spitzer, Jr—Chemist, Calco Chem Div, American Cyanamid Co, Bound Brook, N J. Sponsors: W A Raimond, R J Cegelka.

Conrad Wolf—Partner, Nat Haircloth Co, Member Sackville Mills Co, Wallingford, Pa. Sponsors: R H Drukker, G B McCulloch.

JUNIOR

Larry L Cook—Assistant dyer, Carolina Insulating Yarn Co, Winston-Salem, N C. Sponsors: K Burrow, A M Burt.

ASSOCIATE

J C Fenley—Sales mgr, Paramount Textile Machinery Co, Chicago, Ill.

Herman I Hersh—Director of research, Wells Chemical Co, Evanston, Ill.

STUDENT

Omer M Belisle—St Hyacinthe Textile School, Canada. Sponsor: G R Boulé.

Francis R McDonald—Philadelphia Textile Institute. Sponsor: W H Hughes.

Leonard W Muscelli—Philadelphia Textile Institute. Sponsor: W H Hughes.

CORPORATE

The Adler Company
Carbide & Carbon Chemical Company

Applications for Transfer to Senior Membership

James L Neal — Walter G Silva

NNE Section Award to A L Greenhall

ONE of the features of the annual meeting of the Northern New England Section held at Lowell Technological Institute on December 4 was the formal scholarship award, which is made each year by the Section to the outstanding senior class member enrolled in the Textile Chemistry Course at LTI.

This year's award was made to Armand L Greenhall of New York, N Y. It is awarded on the basis of scholastic achievement, student activities participation, and financial needs. The scholarship is for the amount of $250 which will cover tuition costs.

—◆ ◆—

Report of Clemson College Student Chapter Meeting

THE Clemson College Student Chapter, at a recent business meeting, elected the following slate of officers:

Chairman———W H Moore
Vice Chairman———J F Mattison
Secretary———R L Neely
Treasurer———W O Stone

Committees for the year were appointed at this meeting to plan the program for the year.

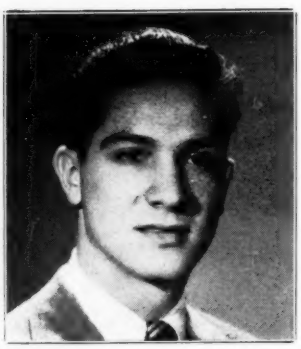
Respectfully submitted,
RICHARD L NEELY, *Secretary*

Second Prize Winner
1953 Student Contest——

FASTNESS PROPERTIES OF ACETATE DYEINGS AFTERTREATED WITH CURABLE RESINS*

FAIRLEIGH DICKINSON COLLEGE STUDENT CHAPTER

Committee
James M Polito
Robert Zecker
Charles Cox



J M Polito

Although the effect of curable resin finishes on the fastness of direct dyes on viscose rayon has already been studied, nothing has yet been published on the effect of such resins on disperse dyes on the acetate component of mixed fabrics. A study has therefore been made of the effect of urea-formaldehyde, melamine-formaldehyde, and of a water-repellent finish on the fastness to light and fastness to gas fading of disperse (acetate) dyes on acetate.

INTRODUCTION

MUCH work has been done in the past decade on the effects of resin treatments on the fastness properties of dyes on viscose rayon. The effects on these properties have been found to be pronounced, especially in the case of direct colors, necessitating a selection of dyes where fastness to light is required.

Very little work has been done in evaluating the effect of these resin treatments on the light and gas-fading fastness of disperse dyes on acetate. This may be for the simple reason that these treatments would not ordinarily be given to a piece of all acetate. However, there are fabrics being processed today that are 25, 50 and even 75% acetate, which are resin-treated and for which the fastness properties would not be known. At least a search of the literature did not show any such tabulations. It is therefore our intention and purpose to make these facts available to the finishing industry. There have been claims made that melamine (British Patent 581,176, Ciba 1942; US Patent 2,176,506, Eastman Kodak) and melamine-formaldehyde aftertreatments (US Patent 2,403,019, Celanese Corp) improved the fastness of acetate dyes to light and to gas fading. These claims could be either proved or disproved by a proper selection of a wide range of acetate colors.

EXPERIMENTAL

DYESTUFFS——For our investigation we selected 65 representative dyes from different dyestuff companies, trying not to use the same prototype twice where prototypes were known. In our selection we also avoided dyes that were known to be mixtures. Where prototypes were not known, it is possible in a very few instances that we used the same type of dyestuff more than once. We dyed these on a delustered acetate crepon because delustered yarns would show an accelerated light fading. We dyed them all at 1% except for a few which were too weak or too strong, adjusting these percentages until we had a uniform tinctorial value in all cases. They were dyed in a liquor-to-cloth ratio of 20:1 for 1¼ hours at 190° F. The dyed samples were then rinsed well and dried.

RESIN FINISHES——The aftertreatments selected were standard types of urea-formaldehyde and melamine-formaldehyde finishes, and a Permel water-repellent finish with added urea-formaldehyde as normally processed. Permel is a durable-type water repellent containing also some resin as a part of the composition. As a catalyst, diammonium phosphate was used since we were not familiar with the composition of proprietary catalysts. The following solutions were prepared for applying the resins:

Urea-Formaldehyde
- 20 parts Aerotex Cream 450
- 4¼% diammonium phosphate (on weight of resin)
- 80 parts water

Melamine-Formaldehyde
- 10 parts Aerotex Resin M-3
- 2% diammonium phosphate (on weight of resin)
- 90 parts water

Permel
- 6 parts Permel
- 10 parts urea-formaldehyde
- 2 parts Resin M-3
- 15 parts ammonia water, 26° Bé
- 1% diammonium phosphate (on weight of resin)
- 81 parts water

APPLICATION——The pieces were split and then sewed together, padded on a laboratory Butterworth padder with the previously mentioned solutions to a 70% expression. They were dried in the air and cured in a regular industrial curing box for 5 minutes at 310° F. After curing, the pieces were washed thoroughly with a neutral detergent and some phosphate to neutralize any acidity, rinsed and dried in the air. Portions of each sample were exposed in a Fade-Ometer 5 hours at a time until a break was noted; other portions were hung in a US Testing Co rotary-type gas chamber for 1, 2, and 3 cycles against a standard ribbon. Thus, for each of the 65 colors there were 4 gas-cycle tests for each of the three treatments and the blank, and there were also light exposures for each finish and the blank. The total number of entries on the cards was therefore 1300.

The results of these entries are tabulated for each color in the following lists, which give the number of Fade-Ometer exposure hours to a break, and the number of gas-fading cycles that the color would stand (up to 3).

* Presented by James Polito at the Conrad Hilton Hotel in Chicago, Illinois, on Thursday noon, Sept 17, 1953, and, in preliminary form, before the New York Section at Fairleigh Dickinson College in Rutherford, N J. on April 17, 1953. The research for this paper was carried out under the direction of Herman P Baumann.

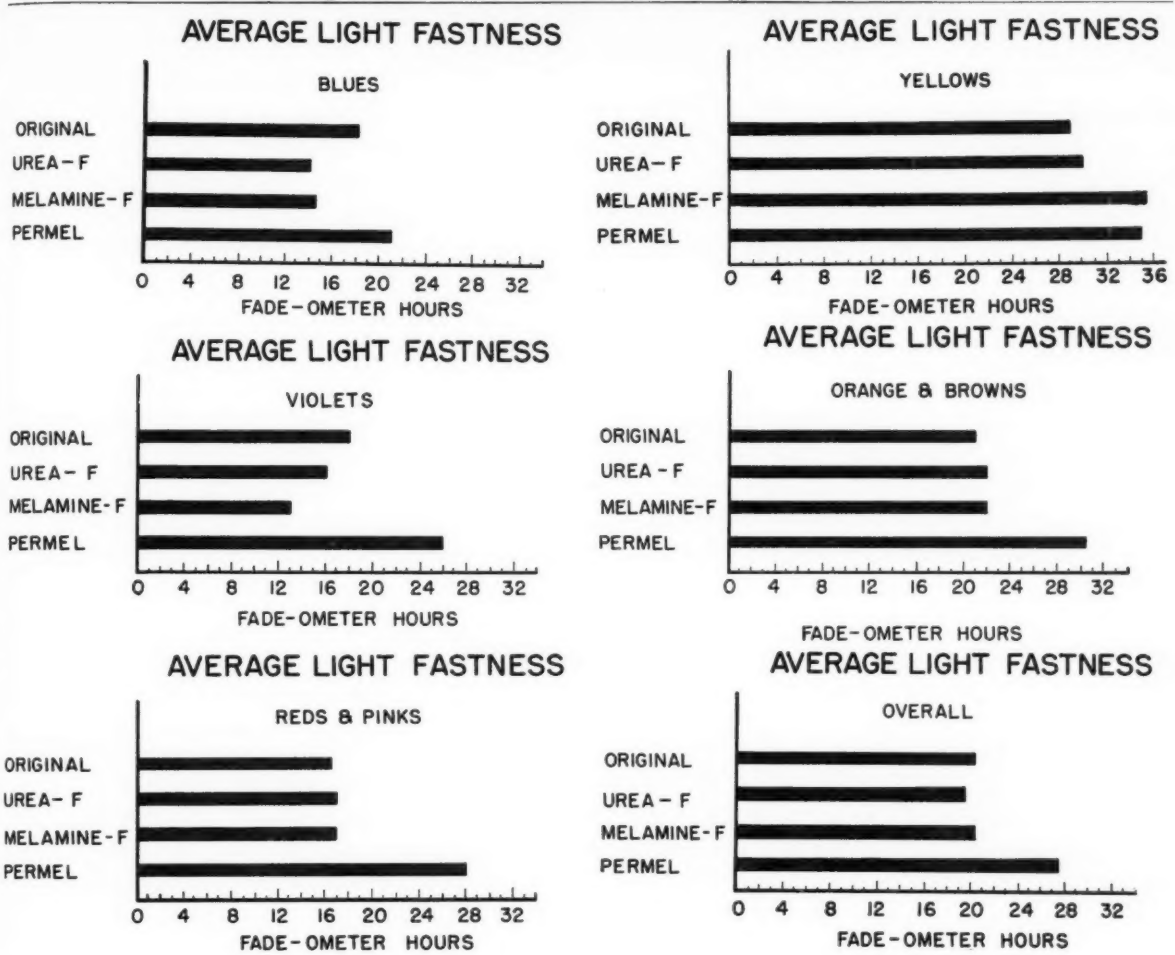


Figure 1

SUMMARY OF TABULAR RESULTS

LIGHT———In order to explain the results conveniently, we have divided the shades into the following groupings: blues, violets, reds, yellows, blacks, oranges and browns. In the reds are included pinks and Bordeauxs. There are no greens or greys. Light exposures for the various colors showed the average number of hours to a break given in Table I. (See also Figure 1).

GAS FADING———As far as gas fading is concerned, we can summarize our findings as follows: For those dyes whose gas-fading fastness is poor, such as blues, violets, and pinks, the effect of the resin treatment is quite pronounced. With the urea-formaldehyde treatment the fastness is adversely affected, the dyestuffs exhibiting a greater break in shade than when untreated. With melamine-formaldehyde the change is practically the same as untreated, except in the case of 10 dyes which were benefitted to the extent of 1 cycle.

TABLE I

FADE-OMETER HOURS TO A BREAK

Disperse Dyes	*Fabric Finish*	*Average Hours*
blues	none	18
	UF	14
	MF	14½
	P	21
violets	none	18
	UF	16
	MF	13
	P	26
reds (also pinks and Bordeauxs)	none	16½
	UF	17
	MF	17
	P	28
yellows	none	29
	UF	30
	MF	35½
	P	35
oranges and browns	none	21
	UF	22
	MF	22
	P	30½
blacks	none	20
	UF	20
	MF	20
	P	20
average for all colors	none	20.3
	UF	19.5
	MF	20.3
	P	27.5

In the case of the Permel treatment the gas-fading fastness was generally improved, especially to the extent that the shade change was not so noticeable. In this respect the Permel treatment aided 20 dyes to the extent of at least one cycle and several to the extent of two cycles. In the case of those dyes that are normally fast to gas fading, no adverse effects from any of the aftertreatments were noticed.

CONCLUSIONS

From the preceding tables we can draw these general conclusions:

a) Disperse dyes on acetate are influenced by resin aftertreatments. Urea-formaldehyde resin affects light fastness adversely, but this effect is slight throughout the range.

b) The melamine-formaldehyde resins affect the light fastness adversely also, except in the case of the yellows, where the effect is generally beneficial.

TABLE II

		Light Test in Hours				Gas-Fading Cycles			
	Percent	Control	U	M	P	Control	U	M	P
Interchem Acetate Blue BN	1.0	25	20	20	25	0	0*	1	1
Interchem Acetate Blue RLF-40	2.0	25	20	20	30	0	0	0	1
Celliton Blue BBA Ex	1.0	10	10	10	20	0	0*	0	1
Eastman Blue GLF	1.0	30	20	20	35	0	0	0	1
Eastone Blue BGF	1.0	5	5	5	5	3	3	3	3
Amacel Brilliant Blue B Ex	0.5	15	10	10	25	0	0*	0	0
Amacel Green Blue II	1.0	30	15	15	20	0	0*	1	1
Eastman Blue GLT	1.0	10	10	10	10	0	0*	0	0
Amacel Violet FSI	1.0	25	20	20	20	0	0*	0	1
Celliton Blue AF	2.0	25	20	20	35	0	0*	1	1
Amacel Blue GLF	1.0	30	20	20	25	0	0*	1	2
Interchem Acetate Blue M	1.0	5	5	5	5	0	0*	0	0
Artisil Direct Blue GFL	1.0	15	15	20	25	1	0*	1	2
Amacel Fast Blue AGF Conc	1.0	20	15	20	20	0	0*	1	1
Amacel Violet II	1.0	15	10	10	15	0	0*	0	0
Eastone Violet BGF	1.0	5	5	5	5	3	3	3	3
Amacel Helio I	1.0	20	10	15	15	0	0*	0	1
Eastman Fast Violet 5RLF	1.0	20	15	20	30	0	0*	1	0
Eastman Fast Violet 3R-GLF	1.0	10	15	20	30	1	0	1	2
Amacel Orange BL	1.0	35	45	45	45	3	3	3	3
Setacyl Brown 2R	1.0	30	20	25	25	3	3	3	3
Celliton Fast Brown 5RA-CF	1.0	25	10	15	30	3	3	3	3
Amacel Rubine B	1.0	15	15	15	30	3	3	3	3
Amacel Rubine IX	1.0	10	15	15	30	3	3	3	3
Interchem Acetate Orange 4R	1.0	10	10	10	20	0	0	2	2
Amacel Fast Brown 3R	1.0	20	15	15	30	3	3	3	3
Eastone Orange 3R	1.0	10	10	15	20	0	0	1	1
Amacel Red 2B	1.0	10	10	10	15	3	3	3	3
Eastone Red B	1.0	20	10	20	20	3	3	3	3
Amacel Light Red FSI	2.0	25	25	25	30	0	0*	1	1
Amacel Fast Red 4BLL	1.0	20	20	20	30	1	3	3	3
Amacel Red VII	1.0	20	25	25	45	0	0	0	1
Amacel Cerise B Ex	1.0	20	10	25	35	0*	0	0	0
Interchem Acetate Yellow G	1.0	20	20	20	30	3	3	3	3
Eastman Yellow GLF	1.0	40	35	50	35	3	3	3	3
Amacel Yellow CW	1.0	20	20	30	20	3	3	3	3
Eastman Yellow 4RLF	1.0	50	50	50	50	3	3	3	3
Amacel Yellow 5G	1.0	20	20	30	30	3	3	3	3
Amacel Red Y	1.0	10	10	10	20	3	3	3	3
Amacel Golden Orange I	2.0	10	10	10	30	3	3	3	3
Amacel Golden Orange III	2.0	40	40	35	45	3	3	3	3
Celliton Yellow 4RL	1.0	50	45	45	45	3	3	3	3
Amacel Golden Yellow IX	1.0	10	10	10	10	0	0	0	1
Interchem Acetate Orange GL	1.0	10	30	20	25	2	2	2	2
Amacel Orange R	1.0	20	30	35	30	2	2	2	2
Amacel Scarlet III	1.0	10	10	10	25	3	3	3	3
Artisil Direct Yellow RN	1.0	10	15	10	20	3	3	3	3
Acetamine Diazo Black 3B	6.0	20	20	20	20	3	3	3	3
Celliton Blue 3G	1.0	10	10	10	15	0	0	0	0
Celliton Fast Navy Blue B	1.0	10	10	10	25	0	0	0	0
Acetate Brilliant Yellow 7G	1.0	20	25	30	30	3	3	3	3
Cibacete Discharge Violet 5R	1.0	30	30	10	35	3	3	3	3
Amacel Scarlet BS	1.0	15	10	10	25	3	3	3	3
Eastone Orange 2R	1.0	30	35	30	50	2	2	2	2
Amacel Black BS (Developed)	6.0	20	20	20	20	3	3	3	3
Eastman Brilliant Fast Red 2B-GLF	1.0	20	25	10	35	1	2	2	3
Celliton Discharge Pink GR	1.0	15	10	10	25	3	3	3	3
Celliton Fast Pink RFG	1.0	10	25	10	25	0	0	1	1
Celliton Fast Violet BA	1.0	25	25	10	50	0	1	0	1
Celliton Fast Pink RF new CF	1.0	30	30	35	35	1	2	3	3
Eastone Blue GFD	1.0	10	10	10	10	3	3	3	3
Eastone Yellow 8GLF	1.0	45	55	55	55	3	3	3	3
Amacel Red VI-X	1.0	15	20	20	15	2	2	3	3
Celliton Yellow 3RLL	1.0	45	45	75	75	3	3	3	3
Celliton Yellow 2GLL	1.0	20	20	20	20	3	3	3	3

* Poorer than no treatment

c) The Permel treatment improves the light fastness in most cases quite considerably.

As far as gas fading fastness is concerned, the urea-formaldehyde does not help; in fact it adversely affects some dyes, notably blues and violets; this point was rechecked because of these marked effects. Melamine-formaldehyde has a slight beneficial effect, while Permel had a stronger beneficial effect on the dyes.

These results are based on the average of 65 different dyestuffs and should provide a useful and reasonably accurate picture of the effect of the resins.

ACKNOWLEDGMENT

We appreciate the services and technical information of the following, and acknowledge their help with thanks:

Herman Baumann and G Kross, American Aniline Products, Metropolitan Division.

Eugene Cohen, Ming Toy Dyeing Co, Haledon, N J.

Werner Von Bergen, Forstmann Woolen Co, Passaic, N J.

Felix Bume, Tennessee-Eastman Co, Lodi, N J.

Carl Brubaker, Standard Bleachery, Carlton Hill, N J.

and

American Cyanamid Co.
General Dyestuff Corp.
Interchemical Corp.

Meeting Reports——
Hudson-Mohawk Section

November 4, 1953

THE Hudson-Mohawk Section met at the Hotel Johnstown, Johnstown, N Y, on November 4 to hear Richard D Fine, Textile Chemical Section, Central Research Laboratories, Atlas Powder Co, Wilmington, Del, deliver a talk on "The Occurrence, Behavior and Elimination of Static in Textiles".

Maurice Fishman, Lee Dyeing Co, reported on plans for the 1954 Intersectional Contest.

Fifty members and guests attended this meeting.

December 4, 1953

THE Section participated in a textile shrinkage symposium at Jack's Restaurant, Albany, N Y, on December 4, 1953, during which the following papers were presented:

"Dimensional Stability of Woven Cotton Goods"———Leonard Lang, Cluett, Peabody and Co, Inc.

"Stability Control of Cotton Knit Goods"———Irwin J Smith, Surpass Chemical Co.

"Aspects of Dimensional Control of Woolen Fabrics"———Frank Murphy, Sanfrolan Technical Service, Cluett, Peabody and Co, Inc.

"Heat-Set Synthetics" ——— Richard Evans II, Lee Dyeing Co.

"Shrinkage Control of Rayons"——— Herbert J Leavitt, Cluett, Peabody and Co, Inc.

An open discussion period followed.

Sixty-seven members were present for this meeting.

Respectfully submitted,
WILLIAM A NELSON, *Secretary*

• PATENT DIGEST •

PAUL WENGRAF

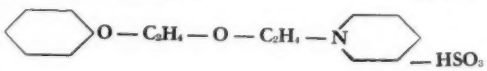
PRINTING INDIGOSOLS——— Aromatic Pyridinium Compounds as Dispersants D, 2, 04

U S Pat 2,628,882
(General Aniline———Randall, Solonew——— Feb 17, 1953)

Leuco ester salts of vat dyes, e g, Indigosols, are generally applied by dissolving the dye in water plus thickener, printing (or dyeing) and fixing the vat dye by subsequent hydrolysis and oxidation. For this purpose, the oxidizing salts to be added to the printing paste may be sodium or ammonium salts of oxidizing acids. Some of these are found to salt out the leuco ester salts, thereby decreasing the solubility in the paste.

According to U S Pat 2,431,708, which is cited in this specification (see references below), this drawback has been overcome by adding sulfobetaines or betaines containing an aralkyl group, e g, the sulfobetaine of dimethylphenylbenzyl ammonium p-sulfonic acid, as dispersants.

The present patent claims that still better effects in this respect may be obtained by using as dispersing agents compounds of the so-called "Zwitter-Ion" type, in which a phenoxy group is linked through an alkyl or alkoxy chain to a pyridinium or quinolinium salt. Typical of products used in this case is phenoxy ethoxy ethyl pyridinium sulfonic acid:



Alkoxy groups (picolines) may be substituted for the pyridine or quinoline nucleus. Otherwise the printing paste is composed of dyestuff, thickener, sodium chlorate, ammonium vanadate (as a catalyst) and thiocyanate or gluconic acid as an acid splitter.

Example: a yellow vat dye (described in U S Pat 1,095,731/1914——Example 2 ——as a condensate of diamino anthraquinone, sodium sulfide and benzotrichloride) is dispersed in a composition containing the pyridinium sulfonate and then mixed with starch-tragacanth thickener, sodium chlorate, ammonium vanadate, ammonia and gluconic acid. The paste forms a clear yellow solution, stable on standing and capable of giving full prints.

Among the references cited by the Patent Office:

U S Pat 2,431,708 (Durand & Huguenin/1947) [cf *Am Dyestuff Reptr* 37, 246 (1948)]: printing Indigosols by adding a water-soluble salt of betaines or sulfobetaines containing an aralkyl-group, e g, N-benzyl pyridinium sulfobetaine, pyridine betaine, etc. This patent is co-pending with U S Pat 2,388,285 (1945), which outlines how dispersible Indigosol dyes may be obtained by incorporating into printing pastes onium compounds containing one solubilizing group, e g, tertiary alkylolamines quaternized with dimethylsulfate, or reaction products of tertiary amines or alkylolamines with ethylene oxide.

U S Pat 2,299,782 (Eastman Kodak/1942): converting cation-active surfactants of the cationic ammonium type into perchlorates, e g, N-nonyl pyridinium perchlorate, in order to facilitate isolation of these compounds from the reaction mixture.

ASTATIC COMPOSITION——— Fatty Acid Partial Esters of Hexitols

U S Pat 2,628,176
(Chicopee Mfg Corp———Simon, Drehlich ———Feb 10, 1953)

The accumulation of static electricity causes great trouble, particularly that caused by the rubbing of thermoplastic materials. Organic polymers, especially Saran, methacrylate resins, polythenes, etc, give undesirable results when used as seat covers or upholstery in automobiles. Since the aforementioned substances are chemically inert, any preparation only sticks to the surface and is easily scrubbed or washed off.

Unexpectedly, certain long-chain fatty acid partial esters not only are found to be efficient antistatics but moreover to combine with smooth and slippery material, such as Saran or polythenes. The preferred esters are derivatives of sorbitan (monolaurate or monostearate) optionally reacted with ethylene oxide and (as mentioned in the claims) generally partial esters of hexitol anhydrides transformed into oxyalkylene derivatives.

One of the examples points out that Saran cloth may be dipped in a 1% dispersion of sorbitan monolaurate, dried, and used in an automobile seat. It is claimed that no static electricity develops in use, the effect being resistant to repeated washing operations.

Among the references cited by the Patent Office:

U S Pat 2,436,219 (Industrial Rayon Corp/1948,: treating a yarn with a composition of hydrogenated fish oil and a reaction product of partial esters of hexitol or the like with alkylene oxide to reduce frictional resistance. (This specification does not mention antistatic effects).

U S Pat 2,404,240 (Industrial Rayon Corp/1946): a thread-conditioning composition containing a major proportion of mineral oil and a minor amount of sorbitan trioleate.

U S Pat 2,403,960 (Carbide & Carbon/1946): suggests water-dispersible polyalkylene polyamine derivatives as antistatics for vinyl polymer fibers.

POLYVINYL ACETATE EMULSIONS—Stabilized with Styrene-Butadiene Copolymers G, 2, 01

U S Pat 2,629,702
(Snyder, Jr———Feb 24, 1953)

The purpose of this invention is to prepare a stable emulsion of polyvinylacetate that can be shipped in concentrated form and diluted thereafter at will. Agitation which causes foaming hitherto has been especially disadvantageous insofar as stability of preparations of this type is concerned.

It has been found that very stable polyvinylacetate emulsions (frequently advocated for textile finishing purposes) can be obtained by adding relatively small amounts of emulsified styrene-butadiene copolymers. The formation of agglomerates by foaming of the emulsion and separation into two different layers, observed in earlier processes, may be avoided.

Example: an aqueous emulsion of polyvinylacetate containing about 55% of solids ("Darex 56—L") is mixed with water and the styrene-butadiene copolymer known as "Dow 512—K" is added. Increased quantities of this stabilizer effect a substantial decrease of agglomeration and decrease formation of a supernatant cloudy layer; in comparison, agglomeration was very strong in the absence of the stabilizer. Apparently no agglomeration was observed after addition of 0.65,1.0 or 1.6 p respectively to one p polyvinylacetate.

References cited by the Patent Office:

U S Pat 2,383,789 (Harvel Research Corp/1945): an artificial rubber composition containing in addition to other com-

ponents a rubbery butadiene copolymer, polyvinyl acetate and an alkylester of abietic acid ("Abalyn" or "Hercolyn"). No application of these mixtures to textile finishing purposes is disclosed in this patent.

U S Pat 2,054,131 (I G Farben A G/ 1936): producing upholstery material containing various types of fibers impregnated with aliphatic vinyl polymers.

CONCENTRATED OIL-IN-WATER EMULSIONS for Dyeing and Printing G, 4, 07

U S Pat 2,631,985
(Sun Chemical Corp———Mullin———
March 17, 1953)

The preamble to this specification stresses the advantages of pigment dyeing and printing, particularly with respect to their increased fastness to light fading The present invention covers the preparation of a high concentrate of the oil-in-water-type which can be diluted with water for dyeing operations or with water, mineral oils and noncolored emulsions (clears) for printing. Several characteristic conditions of these concentrated emulsions reportedly are critical for attaining superior washfastness, fastness to crocking, stability in storage, etc, without imparting excessive stiffness to the dyed or printed goods. These conditions are as follows:

a) The binder, i e, the fixing resin, preferably a butylated melamine-formaldehyde precondensate, must not be present in an amount higher than 15% of the concentrate so as to avoid stiffening; the resin solution (in xylene-butanol) should contain a minor portion (1-1.5%) of a cellulose ether.

b) The ratio of binder material to pigment must not be less than 15 (binder) to 12 (pigment) and not greater than 15:8.5 so as to bring about sufficient fixation.

c) The discontinuous (oily) phase must contain an emulsifying-plasticizing mixture composed of a thermoplastic alkyd resin, a nonionic surfactant of the "Igepal" type (i e, mono-iso octylphenol polyglycol ether) stearic acid and a volatile tertiary amine, such as diethylamino ethylalcohol, forming a soap with stearic acid. The excess of the base volatizes in the subsequent heat aftertreatment. The optimum ratio of binder to this mixture is given as not less than 15 to 9.5 and not greater than 15 to 7.5.

d) Phosphoric acid, an ester or a salt thereof are required to provide the acid curing medium for the melamine precondensate after the volatile amine is removed. The amounts are limited here to 0.15-0.8% of the concentrate.

e) The continuous aqueous phase of the emulsion should comprise not less than 40% and not more than 60% of the concentrated composition.

Curing is effected at 300-350° F.

The versatility of the patented combinations is advantageous. They can either be diluted with water for pad dyeing or made up into printing pastes upon the addition of water, mineral oil and/or colorless clears, e g, compositions comprising carboxymethyl-cellulose, a nonionic assistant (sorbitan monolaurate polyoxyethylene ether) and a solvent solution of butylated melamine formaldehyde as mentioned under (b), but emulsified at a greater concentraiton (30:70) in water.

No references are cited by the Patent Office.

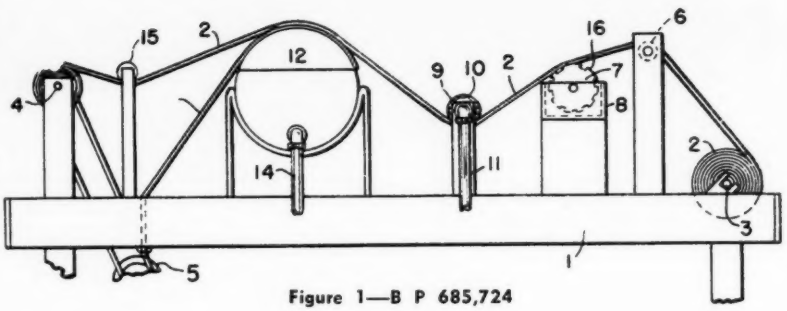


Figure 1—B P 685,724

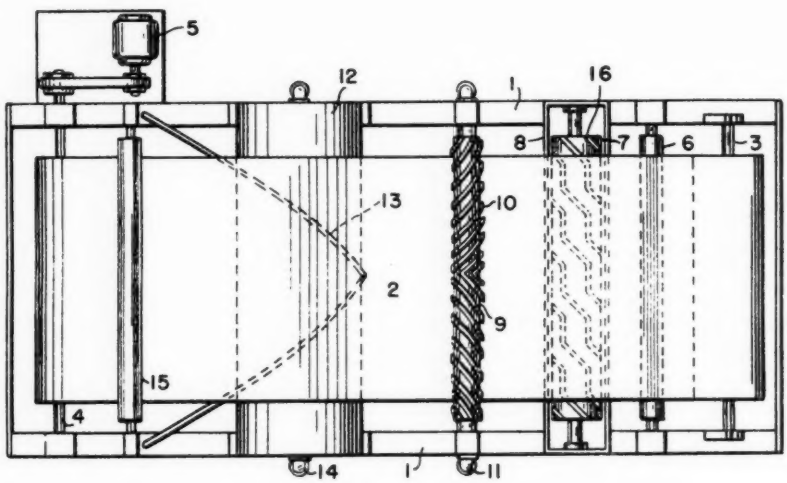


Figure 2—B P 685,724

APPARATUS FOR PRODUCING MOIRÉ DESIGNS G, 4

Brit P 685,724
(Holterhoff———Jan 7, 1953)

Moiré designs on fabrics frequently are produced by first moistening the fabrics on predetermined areas with a colored or noncolored liquid and afterwards subjecting them to a spreading treatment. In an analogous manner printed designs may be obtained.

The fabrics locally wetted with a liquid of the type mentioned or with a printing paste and thereafter subjected to the spreading action of an appropriate bar, plate or the like in order to smooth out the fabrics in lateral direction are apt to show indistinct, blurred effects because the liquid migrates over the outlines of the pattern to the adjacent portions of the fabric. This drawback is especially felt when the local impregnation with the moiré-producing liquid is combined with a tensioning treatment.

Sharp effects reportedly are obtained by passing the wetted fabric *over a heated tool or device* which fixes the liquid before it can migrate during the spreading phase.

Figures 1 and 2 show a fabric (2) coming from roller (3), passing over roller (7) provided with the design-producing raised portions, and dipping in a solution of a phosphate, a sulfonic acid, a colored solution, and so on. Thereafter the fabric is carried over the expander (9), which is heated internally to 200-350°F. The action is completed by a passage over drum (12) bearing a V-shaped ledge (13).

NEWS

Emery Industries, Inc, Research Center

• New Emery Research Center

Emery Industries, Inc, has started construction of a new $800,000 research center adjacent to their plant in Cincinnati, Ohio. The new building will provide new and larger quarters for the Departments of Basic Research, Development, and Chemical Engineering.

Constructed of brick, the two-story, L-shaped, 30,000 sq ft structure will house 28 individual laboratories in one wing with several application laboratories in the basement. Equipment in the latter rooms is designed to evaluate on a plant scale all of Emery's fatty acids, plasticizers, and textile oils in end-use applications. The other wing will contain the research executive offices, library and conference rooms.

The new building will allow expansion of Emery's research facilities to accommodate approximately 100 people. Additional wings can be added to house another 150.

Completion of construction is predicted for late 1954.

• Over 150 to Exhibit at NID Convention

Better than 150 exhibitors will occupy approximately 30,000 square feet of space at the National Guard Armory in Washington, D C, as the National Institute of Drycleaning convenes next month for the 45th Annual Meeting.

This year the business meetings will be held in the mornings February 12, 13, and 14, and the exhibits will be opened at 12:30 each of those days. There will be open-forum discussion meetings in special meeting rooms at the Armory while the exhibit is in progress.

• Chemstrand Begins Shipments of Nylon Filament

First shipments of the new Chemstrand nylon filament yarn produced at The Chemstrand Corporation's nylon manufacturing facilities in Pensacola, Fla, began on December 23rd. These first small shipments will undergo a series of field evaluations under standard commercial conditions, acording to Roy G Hemminghaus, vice president in charge of nylon plant operations.

The plant will be started on a progressive production schedule over a period of one year or more, and upon completion will have a rated capacity of 50,000,000 pounds per year, it is stated.

Chemstrand is a jointly owned associate company of American Viscose Corporation and Monsanto Chemical Company. In June, 1951, Chemstrand became the first company in the United States to be licensed by E I du Pont de Nemours and Company, Inc, to produce nylon.

Ground was broken in July, 1951, for the Chemstrand project on a 2,000 acre tract along the Escambia River 12 miles north of Pensacola. Two and one half years later part of the Chemstrand nylon manufacturing area was put into operation for testing and training purposes. Construction work continues.

Plans call for initial production in fiber spinning, and later bringing into operation the chemical intermediates facilities where all of the raw materials for Chemstrand nylon will be processed.

Chemstrand was formed in March, 1949, to engage in continued research, development and production of synthetic fibers. When in full operation the Chemstrand nylon plant reportedly will employ approximately 3,000 persons,

• Role of Research to be Emphasized at NCC Annual Meeting

The vital role of research in bringing better cotton products to consumers will get renewed emphasis at the National Cotton Council's sixteenth annual meeting at Atlanta, Georgia, on February 1-2, according to Alonzo Bennett, chairman of the Council's Utilization Research Committee.

Mr Bennett points to the strides made in chemical finishing for cotton as being most significant. In this regard he stresses that (1) cotton is an economical raw material offering excellent fiber properties, (2) both the physical and chemical properties of the cotton fiber can easily be modified, and (3) there are big markets for cottons having the specialized properties imparted by chemical treatments.

Mr Bennett has announced that Council delegate members would receive a full report on all cotton research activities at the Atlanta meeting, and sights would be raised on research programs during 1954.

ADR NOW AVAILABLE ON MICROFILM

Arrangements have been completed with University Microfilms, 313 North First Street, Ann Arbor, Michigan, for supplying subscribers of the Reporter with a microfilm edition. This arrangement was effective with the 1952 volume. The film copy will be delivered at the end of the volume year for those who subscribe to the service and it will include all issues published during that period. It is estimated that the film edition requires only 5% of the space required for the paper edition, which is bound. Complete information is available from University Microfilms.

• New Acetate Dyeing Technique Announced by Maupai

The F P Maupai Dyeing Co Inc, West New York, N J, has announced the development of a new dyeing technique for acetate which is said to be superior to known methods of dyeing acetate, nylon, blends of acetate and silk, or cottons. Under development for over two years, the new technique promises gas and light fastness for acetate which, in some instances, is claimed to be comparable to that secured through the solution-dyed acetate process for many colors.

According to reports, the new process produces a finished product having twice the fastness to gas and three times the fastness to light as compared with ordinary acetate dyeing techniques with 3% gas inhibitors added. The new process embodies the use of Eastman gas-fast and light-fast dyes of the GLF series.

Critical control in the dyeing process and extensive knowledge of the characteristics of the fibers in the fabrics are essential.

Many new fabrics which incorporate Chromspun and white acetate yarn, particularly for draperies, offer mills and converters greater flexibility in color selection and reduce the quantity of stock required for any one basic color. Textured fabrics with nubby effects are prepared by constructing the nubby effects with Chromspun, leaving the background to be dyed to any desirable shade. The Chromspun colors do not change in the dyeing process.

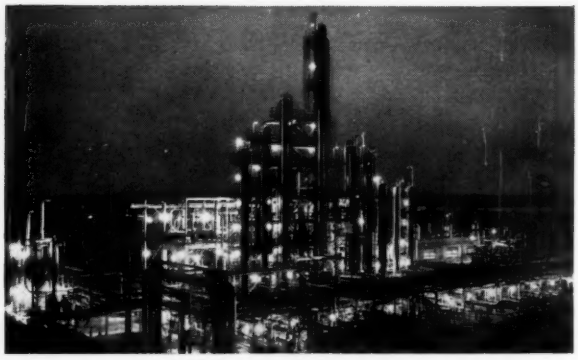
The new technique also lends itself to cross dyeing on jacquard weaves that were heretofore obtained mostly through the combination of yarn dyeing and jacquard weaving.

The new dyeing technique was announced by Eugene L Maupai on the eve of celebrating the 65th anniversary of the establishing of the firm in New York. At that time, it was the only silk dyehouse in New York, and was established by the late Ferdinand Maupai.

Most of the dye jobs utilizing the Eastman dyes are tested to withstand 4 gas cycles and 60 hours on the Fade-ometer. While test results have shown that the new method provides colors which stand washing fairly well, experimental work in both the laboratory and plant is continuing toward the development of a higher level of fastness.

The colors are said to withstand more than the usual hazards of drycleaning, perspiration and crocking. The Maupai technique apparently offers greater penetration of the color into the fiber. The fastness standards are rated according to AATCC standard tests and tests are made throughout runs to assure uniform quality.

No license arrangements are being considered at the present time.



In these recovery and refining units at Semet-Solvay Petrochemical Division's Niagara Plant, ethylene is recovered from oil gas. Piped to an adjoining polymer plant, the ethylene is processed into A-C Polyethylene. Expected rate of production is 20 million pounds a year.

• Semet-Solvay Opens New Petrochemical Plant

Semet-Solvay Petrochemical Division, Allied Chemical & Dye Corporation, New York, announced on January 6th the opening of its new Niagara River Petrochemical Plant at Tonawanda, New York, for production of polyethylene products.

The ethylene is derived from gas which is produced from fuel oil in equipment designed and erected by Semet-Solvay Engineering Division.

The ethylene plant was designed and constructed by The Lummus Company, and the plant for production of A-C Polyethylene was designed by Semet-Solvay Engineering Division. The processes inherent in the operation of the latter plant originated in Allied's Central Research Laboratory at Morristown, New Jersey, and have been further developed by Semet-Solvay, in collaboration with the Central Research Laboratory staff by the operation of a pilot plant at Buffalo. Production is estimated at 20 million pounds annually, which will serve to supply a portion of the rapidly growing market.

• Rodney Hunt Names Southeastern Representative

The Rodney Hunt Machine Co, Orange, Massachusetts, has announced the appointment of Industrial Heat Engineering Company, Greenville, South Carolina, as sales and service representative in the Southeastern states. This company will handle Rodney Hunt's complete line of textile wet-finishing machinery.

L Vincent Neese, former Rodney Hunt salesman at Charlotte, has joined the Industrial Heat Engineering Company's organization. Tom Kitchen, Sales Manager of the organization, was for a number of years Southern salesman for Rodney Hunt.

• American Dyewood Expands Operations

The American Dyewood Company, a subsidiary of United Dye & Chemical Corporation, a major manufacturer of dyes and pigments, is expanding its operations in cement colors and allied fields. The company has launched its promotion in these markets with a new pocket-size brochure, which describes the full range of its Nycolime colors and their applications.

Nycolime colors, according to J P Boksenbom, president of the company, are the result of more than 20 years of experience in the water-dispersible pigment field and have undergone severe laboratory and field tests. They are used for coloring cement, mortar, stucco, waterproofing compounds and similar materials in both interior and exterior applications. Emulsion and casein base paints, calcimines, artists' water colors and fresco colors constitute additional markets for Nycolime.

The brochure features Nycolime in eight colors—yellow, red, blue, brown, black and three shades of green. All the colors are said to be fast to alkali. The blue and two shades of green are manufactured in both dense and transparent types.

The Nycolime colors are specially designed for cement-type compounds, reportedly mix uniformly with these products, and are readily adaptable to ornamentation. There are three ways of applying them to cement or concrete: 1) by mixing the desired color right with the sand, gravel, cement and water; 2) after the cement is poured, laying a thin layer of colored cement on top; 3) troweling the color into the cement surface.

Further information may be obtained from the American Dyewood Co, Department A, Belleville 9, N J.

• Hercules Plans Large-Scale Manufacture of DMT

Plans for the large-scale manufacture of a key basic material for one of the promising new synthetic fibers were revealed in Wilmington earlier this month by Hercules Powder Company. According to the announcement Hercules will begin immediate construction of a $4,000,000 plant for the manufacture of DMT (dimethyl terephthalate) the basic chemical used in the manufacture of Terylene, British trade name for the polyethylene terephthalate fiber developed in that country and known in the United States as Dacron.

This is the second industrial field to be entered by Hercules within a year. Early in 1953 the company announced it was building an $8,000,000 plant at Gibbstown, N J, for the production of phenol and acetone, construction of which is well along.

The new plant will be built on the site of present Hercules synthetic resin facilities at Burlington, N J.

The plant will supply DMT for the $22,000,000 Terylene plant now being built by Imperial Chemical Industries of Canada Limited at Millhaven, Ontario.

The Hercules plant reportedly will be the first to manufacture dimethyl terephthalate using a new air oxidation process. It will have an annual capacity of about 12,000,000 lbs a year, it is reported, and will be designed so that this capacity can be increased as other markets for dimethyl terephthalate are developed.

Hercules officials anticipate that, as research and market development plans progress, substantial demands will be forthcoming for dimethyl terephthalate for uses other than synthetic fibers. The new Hercules plant also will supply demands of producers of Terylene in other foreign countries.

Preliminary construction phases will begin immediately and the plant is expected to be in operation in May, 1955. Hercules will act as its own prime contractor, with some phases of the construction to be subcontracted. When in operation the plant will add about 50 permanent employes to the Burlington plant payroll.

Officials of Imperial Chemical Industries of Canada Limited estimate that the Millhaven plant will be in operation about June, 1955. Dimethyl terephthalate now being produced in semiplant facilities at Burlington will supply the Canadian pilot plant until the new Hercules plant is in full operation.

Hercules has negotiated the rights to use the basic chemistry of the air oxidation process for the production of dimethyl terephthalate in this country from California Research Corporation and owns exclusive rights in Canada to the Imhausen Werke patent applications, which cover the same chemistry.

Hercules officials have pointed out that the company would continue a research and development program on dimethyl isophthalate, which will be made available when semi-plant facilities now being used for dimethyl terephthalate are released.

• Egli to Head GDGA for '54

John Egli, head of General Dyeing Co, Indianapolis, was elected president of the Garment Dyers Guild of America for 1954 in the two-day clinic and meeting at Indianapolis, Ind, on December 4th and 5th. Mr Egli, one of the founders of the organization five years ago, has been continually on the board, first as secretary-treasurer and more recently as a vice president.

Lawrence Jacobson, Jacobson Dye Works, Philadelphia, was elected vice president. Mrs Lucien Dietrich, Dietrich Dyers, St Louis, was re-elected to continue as secretary-treasurer, and Allan J Copeland, Grant, Schwenck & Baker, Inc, Chicago, was retained for an additional term as executive secretary. Mr Copeland's firm is the advertising agency which handles the Guild's advertising account.

The two-day meeting combined technical with business discussions. Friday morning was devoted to an inspection of the General Dyeing Co, plant where equipment, processes and methods were inspected. In the afternoon the visit was discussed and technical matters pertaining to dyeing, especially as regards some of the new synthetics, were discussed.

The business meeting concerned itself with promotional and other activities of the Guild and discussion of the material to be used in the Guild's display booth at the NID Convention in Washington next month.

• Solvay Begins Chlorine-Caustic Soda Operations at Moundsville

Start-up of chlorine-caustic soda operations at the new Perkins Plant of the Solvay Process Division, Allied Chemical & Dye Corporation, Moundsville, W Va, was announced by the Company on December 17th.

The plant, Solvay's initial operation in the Moundsville area, utilizes the salt from the deposit located under the property as raw material in its chemical production. The new Solvay installation reportedly will provide employment for approximately 125 people.

A plant for the production of chlorinated methane products is now being built by Solvay at Moundsville and is expected to go into operation this summer. Chlorine for this project will be supplied by the new chlorine-caustic soda plant.

• UDCC Acquires Controlling Interest in Camden Forge

United Dye and Chemical Corporation, Belleville, New Jersey, has acquired a controlling interest in Camden Forge Company, according to an announcement by V D Dardi, UDCC chairman. United has irrevocably offered to purchase all the rest of Camden's issued and outstanding common stock at $17.50 a share, Mr Dardi added.

Camden Forge Company has been a leading producer of heavy forgings for many years, supplying products to the railroad, aircraft, shipbuilding, mining, electrical equipment, and other basic industries. It reportedly has facilities to turn out forgings more than 100 feet long, and its extrusion presses are among the largest in the world.

"The purchase of Camden is an important forward step in United's long-range program of expansion and product diversification," Mr Dardi said. "With the acquisition of this long-established and outstandingly successful company, United is in a better position than ever before to meet changing economic conditions in the years to come."

United will announce the election of a new Board of Directors for Camden and the appointment of new executive officers in the near future.

• Stream Pollution Abatement Efforts Increasing

Construction contracts for 155 projects to aid in the Nation's stream pollution abatement efforts, through providing treatment of sewage from municipalities, institutions, and other significant population centers, were awarded during the third quarter of 1953, the Public Health Service of the Department of Health, Education and Welfare reported last month. The contracts totaled $38 million and covered 87 new plants and 68 additions, enlargements, or improvements to existing plants.

In releasing this report, Leonard A Scheele, Surgeon General of the Public Health Service, expressed gratification at the upturn in the annual rate of sewage treatment plant construction. "It is a reflection," he said, "of the job being done by State water pollution control agencies in making communities aware of the importance of pollution abatement as an aid in strengthening our public health defenses and safeguarding our water resources. Citizens are continuing to vote funds for construction of facilities to keep the Nation's waters clean, so that they may be used over and over again."

The Public Health Service report is based on data obtained from all the State water pollution control agencies, construction reports of the F W Dodge Corporation, and other construction news sources.

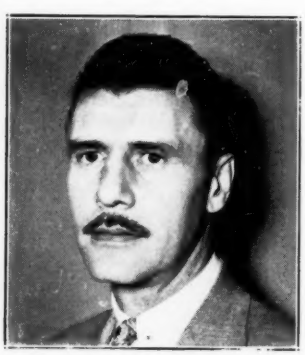
NAMES IN THE NEWS

W M Scott

WALTER M SCOTT, assistant chief of the Bureau of Agricultural and Industrial Chemistry, U S Department of Agriculture, Washington, D C, is currently celebrating the 40th anniversary of his first scientific publication. Dr Scott has been active over the years in the fields of organic synthesis, the evaluation and application of dyes, silk processing, cotton as a fiber and as a chemical, color, and general textile technology.

A charter mem er of the American Association of Textile Chemists and Colorists, Dr Scott is a member of the Association's Executive Committee on Research and also its Technical Committee on Research. With the latter committee he is a member of the subcommittee on color, and chairman of the reference subcommitee on wash fastness tests for dyed or printed silk. Dr Scott was active in the formation of the Washingon Section, AATCC, which he is now serving as a Councilor.

THE appointment of ROBERT E MEEKER as assistant to the general sales manager, The Macbeth Corporation and subsidiaries, Newburgh, N Y, became effective January 1st. Mr Meeker was previously sales manager of the Master Rule Co, Middletown, N Y.



R E Meeker

THE following officers were elected at the 32nd annual meeting of the Synthetic Organic Chemical Manufacturers Association:

President ——— CARY R WAGNER, General Aniline & Film Corp.

1st Vice President ——— SAMUEL LEHNER, E I du Pont de Nemours & Co, Inc.

2nd Vice President———R WOLCOTT HOOKER, Hooker Electrochemical Co.

Treasurer———HENRY L YOUNG, Interchemical Corp.

Board Members (Class of 1956)——— CARL E VAN WINCKEL, Carwin Co and LEO B GRANT, Dow Chemical Co.

ELVIN H KILLHEFFER, formerly of E I du Pont de Nemours & Co, Inc, and AUGUST MERZ, American Cyanamid Co, were elected honorary members of the Board of Governors for 1954.

V Boise

VALENTINE BOISE has joined the New York office of General Dyestuff Corporation as market manager, industrial dyestuffs. Prior to joining GDC, Mr Boise had been associated with Harmon Color Works as a general sales representative.

ELECTION of four new vice presidents, a corporation secretary and assistant secretary for The Chemstrand Corporation was announced last month, at a board of directors' meeting in New York.

The newly named vice presidents are: ROY G HEMMINGHAUS, F WILLIAM KOSTER, WILLIAM G LUTTGE and FRANK J SODAY. THOMAS H CHOATE was elected secretary and JAMES H CROW, JR, assistant secretary.

At the meeting, CHARLES S VENABLE, director of the Chemical Research Department of American Viscose Corporation, resigned as vice president of Chemstrand, a position he assumed in March, 1949, to assist in the development stages of the corporation. Dr Venable will remain as a member of the Chemstrand board.

A E Mitchell

WITH the opening of a new office in Charlotte, N C, United Aniline Company, Boston, Mass, has announced the appointment of ARTHUR E MITCHELL to cover the southeastern territory. United Aniline's expanded service in the South will be paced by increased warehouse and shipping facilities in Charlotte.

Mr Mitchell is prominent in the Chicago area where he represented Sandoz Chemical Works for several years.

PHILIP L FACTOR, superintendent of bleaching and dyeing at the Boston Knitting Mills, Inc, Newton, Mass, for the past fifteen years, is now president and treasurer of the newly formed Newton Textile Bleaching & Dyeing, Inc, 75 Adams Street, Newton, Mass. This firm will serve the knitting trade in bleaching and dyeing of tubular knit cotton fabrics.

WILLIAM J GREENE, JR, has joined the staff of Berkshire Color & Chemical Corp, Springfield, Mass, as technical sales representative covering the textile industry in New England and upper New York state.

Mr Greene comes to Berkshire from R T Vanderbilt Co where he served as New England representative. Prior to this, he was manager of the Sumter (S C) Textile Mills.

W J Greene, Jr

K H Klipstein

J T Thurston

L C Duncan

V E Atkins

SEVERAL changes in the managerial organization of the American Cyanamid Company became effective January 1.

KENNETH H KLIPSTEIN has been appointed general manager of the newly created Research Division, which will be responsible for the operation of the Stamford Research Laboratories under the direction of J T THURSTON. It will also supervise other research and development programs which are not the direct responsibility of operating divisions and will coordinate these programs with related activities of the operating divisions.

A new division known as the Organic Chemicals Division has been organized. L C DUNCAN has been named general manager of this division and V E ATKINS, assistant general manager. The Organic Chemicals Division will merge and consolidate the activities of the Petrochemicals Division with those of the Calco Chemical Division.

Another change has created the Fine Chemicals Division with A B CLOW as general manager and A R LOOSLI, assistant general manager. This division will operate the Princeton, New Jersey, Plant (recently purchased from Heyden Chemical Company) and will handle domestic sales of bulk antibiotics, bulk pharmaceuticals (including those heretofore produced and sold by the Calco Chemical Division), and the animal feed products formerly handled by the Lederle Laboratories Division.

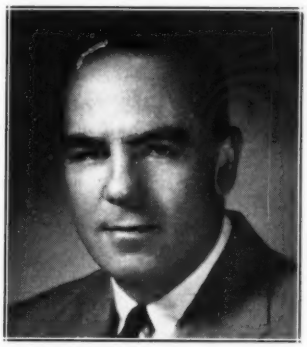
The new Pigments Division will be responsible for the production and sale of titanium dioxide and other pigments formerly handled by the Calco Chemical Division. J ALLEGAERT has been named general manager and A B HETTRICK, assistant general manager, of this division.

These changes make it possible for S C MOODY, vice president, and R C SWAIN, vice president, to devote all their time to general staff matters and to assist in the determination of Company policy.

J D McPHERSON has been named assistant manager of the Manufacturers Chemicals Department, Industrial Chemicals Division. In his new position Mr McPherson will continue to operate as technical director of the Department.

JOHN O'DAY, president and treasurer of the U S Dyestuff Corp, Boston, Mass, from 1914 to 1953, has resigned all connections with the firm in order to head the John O'Day Company, dyestuffs and textile chemicals, exports and imports, manufacturers' agents and dye consultants to the textile industry. The temporary office address of the new concern will be 24 Dean Road, Brookline, Mass. Warehouse and shipping will be handled from 5 Station St, Brookline.

A B Clow



A R Loosli

A B Hettrick

J Allegaert

P KAY SCHWARTZ has been named president of Proctor & Schwartz, Inc, Philadelphia manufacturers of textile machinery and industrial drying equipment, succeeding THOMAS W ALLEN who has retired after nearly 48 years with the Company, the last eight of which were as president. Mr Allen will continue to serve as a member of the Board of Directors.

At the same time MYRON T FLEMING becomes executive vice president, the post held by Mr Schwartz for the past two years. Mr Fleming, who has been vice president in charge of the Company's Dryer Division, will continue to direct the work of this Division along with his other duties.

THOMAS J HERMAN has joined the sales staff of Givaudan-Delawanna, Inc and its associate companies, Givaudan Flavors Inc and Sindar Corporation. He will service accounts in the territory covered by the Cincinnati branch office.

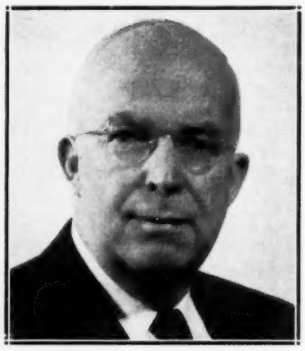
C R Trommer

CHARLES R TROMMER, formerly with Colgate Piece Dye Works, has joined the staff of Colonial Piece Dye Works, Inc, North Bergen, N J, as a plant dye chemist.

ALDEN W COUNSELL and EVELYN RAMALHETE have been approved by the Board of Trustees of the New Bedford Institute of Textiles and Technology as instructors in the Department of Engineering and Department of Textiles respectively.

P J WOOD, technical director of Royce Chemical Company, Carlton Hill, New Jersey, addressed the senior Chemistry and Dyeing class at the Philadelphia Textile Institute December 15th.

Mr Wood spoke on "Production, Use and Evaluation of Enzymes in the Textile Industry." This talk was part of the senior seminar series sponsored by the Institute which features weekly talks to the senior students by prominent men in the industry.



D Martin

DONALD MARTIN has joined Riedl & Freede, Inc, Advertising, New York, N Y and Paterson, N J, as account executive.

Mr Martin has been a well-known figure in the chemical and industrial fields for more than 25 years as a manufacturer, sales manager and advertising executive. In 1929, he founded the Aqua Sec Corporation and introduced a practical water repellent to the textile industry in 1930. In 1943, he joined General Dyestuff Corporation as the sales manager of its Organic Chemical Division, and in 1950, was named sales promotion and advertising manager for GDC. He later went to Sterling Advertising, New York, where he founded the agency's Industrial Division.

RUSSELL H DUNHAM, the first president and former chairman of the board of directors of Hercules Powder Company, retired from active service last month after 51 years of service with the company. He will remain a member of the company's board of directors and finance committee.

HERMAN R THIES has been promoted to general manager of all chemical products for The Goodyear Tire & Rubber Co. He has been with Goodyear since 1930 and was made manager of the Chemical Division when it was first organized in 1948.

H R Thies

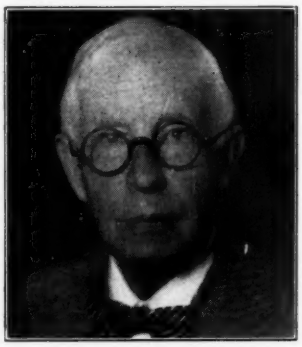
FRANK L BRADLEY, Forstmann Woolen Company engineering manager, has been elected a Fellow by the American Society of Mechanical Engineers. The presentation of the award was made at ASME's annual meeting last month in New York.

Mr Bradley has been with Forstmann since 1931.

CARBIDE and Carbon Chemicals Company, a Division of Union Carbide and Carbon Corporation, has named six new assistant managers in the following districts:

New York———G E KUEHN and J K MARSHALL
Chicago———J J BERRY
Cincinnati———H H NOREN
San Francisco———G E BERNARD
St Louis———H E KLEIN.

OBITUARY



A A Claflin

A A Claflin

FUNERAL services were held on January 7th at Winchester, Mass for ALAN A CLAFLIN, 80, a charter member of the Northern New England Section, American Association of Textile Chemists and Colorists.

Mr Claflin, a consulting chemist, began his career of 59 years in the textile industry with the Avery Chemical Company, Littleton, Mass, shortly after his graduation from Massachusetts Institute of Technology. In 1918 he founded his own firm in Boston, specializing in products for the textile industry.

In 1950 he and Kenneth L Dorman formed the Claflin-Dorman Co, which acted as New England sales representative for the Hilton-Davis Chemical Co, Cincinnati, Ohio.

In addition to his activities in AATCC, Mr Claflin was a member of the American Chemical Society, the Society of the Chemical Industry and the Society of Dyers and Colourists.

He is survived by his widow, a sister, and two sons.